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THE
DOCTRINE
OF
INFLAMMATIONS

Founded upon Reason and Experience;

AND
Intirely cleared from the contradictory
Systems of

BOERHAAVE, VAN SWIETEN, and Others.

By DANIEL MAGENISE, M. D.

L O N D O N:

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DOO C T R I N E

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DEDICATION
T O

Sir *Clifton Wintringham*,

Fellow of the College of Physicians in
London, and of the Royal Society, and
Physician in Ordinary to his Majesty,
the King of Great Britain, &c. &c. &c.

S I R,

THE skill and judgment, by
which you adorn both your
profession, and the honourable office
you hold from his Majesty, with
the humanity, disinterested behaviour,
and those other qualifications, which
made you so valuable to the Nation,
both at home and abroad, have in-
duced me to bespeak your patronage
for this work, after its being laid
aside for many years, in which state
it might, perhaps, have still conti-
nued, had not your eye at length

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given

DEDICATION.

given it new light, and myself a justifiable courage to offer it to the public perusal. I have, therefore, taken the liberty to prefix your name to it, that being, through your approbation, presented to the learned world, it may engage the candid part of it after your example, to receive favourably what it finds useful in it, and pass over humanely the slips and errors which have escaped him, who, with great pleasure, embraces this opportunity to acknowledge himself to be,

S I R,

Your most obliged humble Servant,

DANIEL MAGENISE.

P R E F A C E.

NO disorder is more common, or attended with greater danger than an inflammation; yet in the best physical Authors, we find its causes and effects, not only confused, but even involved in manifest contradictions.

As an inflammation is the principal source of most disorders, it is easy to perceive, how difficult it is, to give a compleat treatise of it; and that it is impossible in the narrow limits appointed for this essay to describe the various forms it assumes in the different parts of the human body; I shall, therefore, only enquire into its general causes; and for the better accomplishment of my design, and to enable the Reader to judge, whether the doctrine of inflammations receives any amendment from what is advanced in this treatise, I shall compare it with the opinions of some eminent Physicians, whose theory and practice are at present universally defended in the Schools, both of Physic and Surgery.

It is much more difficult to discover the causes of disorders, than to prescribe for their cure; and it is by his skill and sagacity in making such discoveries, that a
Phyfi-

P R E F A C E.

Physician shews how much he is above the level of Mountebanks and Pretenders.

As it is impossible to have experienced Physicians always at hand, where inflammations may happen, my design in this work, is, to the best of my abilities, to clear up what regards the efficient causes of this disorder, for the benefit of the younger and less experienced Practitioners.

FROM the Authors published hitherto, I can quote no authority to support what I advance concerning inflammations: therefore, to prove it, I am obliged to draw arguments from the very essence or nature of the disorder; and although these may labour under the danger of novelty, yet I have ventured to publish them such as they are, with a view to fix the theory and practice of inflammatory disorders upon experience and rational principles. It may appear a presumption to deviate from the beaten path; yet, as a member of Society, my duty in some measure engaged me to make this trial; and if I cannot succeed in my endeavours, it may, perhaps, excite the emulation of the learned to accomplish it hereafter.

P R E F A C E.

I AM to give the Reader, without the help of any system or hypothesis, a clear idea of the various effects of an inflammation; point out how they are produced by the simple laws of nature, and prove my assertions by such familiar examples, as daily occur in the practice of physic, and in the common actions of life.

LEAST the Reader should lose any time in forming difficulties against my doctrine, I have laid before him the principal objections that may be made against it with their answers.

THIS work being chiefly designed for the Gentlemen of the Faculty, who are all supposed to understand Latin, I thought it needless to insert the English of my quotations, as it would only swell the volume unnecessarily. And any curious Person, who may chuse to amuse himself with physical enquiries, can be at no great loss, though he were no proficient in Latin; because the remarks on every quotation, include whatever regards the doctrine of inflammations.

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THE
DOCTRINE
OF
INFLAMMATIONS.

CHAP. I.
Of INFLAMMATIONS.

SECT. I.
Of a PHLEGMON.

BOERHAAVE takes the definition of an inflammation or phlegmon from its causes. Fernellius in imitation of all the Antients defines it by its effects, and allows the blood to be its proximate cause. This Author was the first of the Moderns, who collected from the Latin, Greek and Arabian Authors what he observed to be true and solid, and such as by convincing arguments

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guments proved to be useful in the practice of physic. He was so impartial in adopting their doctrine, that without favouring one more than the other, he omitted nothing of what he found requisite for the perfection of that science.

Most authors adorn their works with the authority of the Antients, Boerhaave and Van Swieten generally quote for that purpose, Galen, Celsus, or Ægineta. Fernellius in every principal point agrees with the three last-mentioned Authors; he is also clearer, more methodical, and throws more light on every subject than any of them; for which reason, I design to illustrate the beginning of every principle article of this treatise, with an extract of what he has collected from the antients concerning an inflammation and its various effects. It will, without doubt,

doubt, be agreeable to the reader, as it is the most exact specimen of the kind, transmitted to us on that subject. I shall afterwards propose the principles of my own doctrine, and compare them with the systems of Boerhaave and Van Swieten.

PHLEGMONE tumor est calidus præternaturam collectus, præminens atque circum scriptus, ovi saltem galinacei magnitudine. Huic quasi ex igne aut ex balneo rubor inest: calor quoque ex inflammatione vehemens quasi pars uratur: distensio ex copia renitens: pulsatio profunda & molesta, quod arteriarum diastole partem inflammatam feriat: dolor ex calore, ex pulsu atque tensione acerbis, præsertim quum pars eximio sensu prædita est. Causa continens sanguis est, non in solam cutem, sed in

subjectam quoque carnem impactus, qui e venis eo tandem confluit. Quum enim venæ arteriæque majores immoderata sanguinis copia distenduntur, hanc gravatæ in minores quasi onus deponunt, ex his demum in minimas. Ac tum per earum oscula perque tunicarum meatus sanguis cohiberi non potis, effluit illabiturque in spatia vacua quæ inter fibras sunt primorum corporum, præcipueque musculorum, venarum, arteriarum, nervorum atque membranarum. Hæ partes fluxione dum perfunduntur implenturque, distentæ copia quasi divelluntur, ferventisque sanguinis ardore incallescunt, doloremque faciunt. Sanguis quippe extra vasa collectus, nec libere perflabilis, necessario putrescit atque inflammatur. Ita quidem si purus is erat, ex quifita phlegmone fit, cujus species sunt: ophthalmia, parotis, angina, parulis in gingivis, aliaque ex par-

partibus nomina adeptae. Est & alia minus exquisita, cujus non sincerus est sanguinis, sed aliorum quoque humorum particeps. Hinc fiunt phlegmone erysipelatodes et schir-
todes. FERNEL. *de Extern. Corp. Affect.* pag. 608.

Φ. I. A HOT swelling preternaturally collected, whereof the blood is the proximate cause, supposes a derivation of this fluid to the affected part. This was the opinion of all the Antients; it is the source from which Dr. Sauvage, Professor of Physic in the University of Montpellier, has taken his system; for he maintains that the encreased velocity of the fluids is the only proximate cause of an inflammation.

SOME of the antients compared an inflammation to a concentrated fire, and it is from thence, perhaps,

6 *Of a* PHLEGMON.

Boerhaave took his attrition of the solids and fluids, which always supposes heat.

Φ. 2. FERNELLIUS distinguishes inflammatory swellings into tumours, tubercles and pustules. A tubercle is less than a tumour, but larger than a pustule. To these also he gives different names according to their appearances, and the parts they attack, whether glandular or fleshy*. The largest tumour that appears in the skin or fleshy part, he calls a phlegmon, which he says should be as big as a hen's egg. Though the name of phlegmon is confined here, by our Author, to a particular tumour yet under that title, he gives us a general notion of inflammations according to the mode of the antients, and in another part of his pathology, we read, *Ipsa denique in-*

* Vide, pag. 608, Pathologiæ.

inflam-

Of a PHLEGMON. 7

*inflammatio quam proprie phlegmonem
appellamus*.*

Φ. 3. Pain is the first effect of an inflammation, although our author says that it arises from the heat, pulsation and distension, which attend that disorder. It is true, that as these are violent situations of the solids and fluids, they bring on an additional irritation, whereby the primitive pain is augmented; so that this saying of Virgil may be very well adapted to pain.

*—Malum quo non aliud velocius ullum,
Mobilitate viget viresque acquirit eundo.*

Φ. 4. A PHLEGMON takes different names from the parts it affects; if it attacks the eye, it is called an opthalmia; if the brain, a phrenzy; if the throat, a quinsy; if the

* Vide, pag. 379. Pathologiæ.

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pleura, a pleurisy; if the lungs, a peripneumony, &c.

Φ. 5. OUR Author mentions three sorts of vessels through which the blood is to pass before it works its way into the cellular membrane to form a tumour; and that when it gets into this membrane, it produces the symptoms which attend suppuration.

Φ. 6. A PHLEGMON by the antients and moderns is called erysipelatous, if the swelling is supposed to contain a bilious fluid; œdematous, if a watery humour; and schirrous, if an indurated atribiliary matter*.

†. The inaccuracy of this distinction will be discussed in Sect. 2. and Sect. 3.

* *Traité des tumeurs*, par M. Astruc, Medecin de S. M. T. C.

† *Chirurgie complete des modernes*, par M. Le Clerc, Medecin de S. M. T. C.

Φ. 7.

Φ. 7. INFLAMMATIONS of any other disorders become known by their names, effects, or causes; by the very name of a phlegmon every one understands an inflammatory tumour. The effects which characterise it, are a swelling with redness, heat and pain; they are all enumerated by Fernellius; but as they suppose some cause, they can supply the mind with no curative indication. The effects of a disorder may lead an experienced Physician to the knowledge of its cause; but as there is a real distinction between the cause and effects, the indication taken from the former, cannot be supposed to proceed from the latter. From whence we may judge, that the knowledge which results from the names and effects of diseases, is very defective; and consequently the indications which can be drawn from thence must be equally so; and that those

those who fix their practice upon so uncertain a foundation, must be liable to many dangerous errors; for giving no attention to the fundamental principles of physic, nor to the sympathy which subsists between the different parts of the human body, they never hesitate to prescribe cephalics, for example, for every disorder of the head, although they generally proceed from an indisposition of the stomach charged, as it often happens, with a saburra. But if those people knew how to trace out the original causes, they would prescribe evacuants instead of cephalics, and would be thus enabled to give the patient (at the same time) a true prognostic concerning his cure.

As the practice of the Antients with regard to a phlegmon, could have been founded upon nothing else but the effects enumerated by
Fernelius,

Fernellius, we can easily judge how obscure and intricate it must have been. What I have extracted from this Author, is a compendium of what he found most select in the writings of the antients concerning the present subject.

Now by the method I have purposed to follow, I am engaged to enquire into the opinions of our own cotemporary Physicians; but in order to accomplish my design, it would be an endless work to cite what was said on that subject by each of them in particular; for which reason, I have selected Boerhaave, whose doctrine concerning inflammations is universally adopted by the Physicians and Surgeons of the present age. That the doctrine of so great a man should be called in question, by a person whose name is quite unknown to the learned,

ed, will appear to most people to be too bold an undertaking; and the more so, as it has been so much illustrated by the celebrated Van Swieten, that it cannot be contradicted by any Physician, let him be ever so learned, without endangering his reputation. Notwithstanding these discouragements, the desire of being serviceable to mankind, and particularly to young Physicians and Surgeons, engaged me to examine it still farther, and to try to fix it upon evident principles; for nothing can dishearten students more in the pursuit of learning, than to find the basis of their art founded upon obscurity and contradictions. They must certainly be well pleased to be cautioned against the three fountains of error, which I have discovered in the doctrine of Boerhaave, for if they were not forewarned, they might unwarily fall into

into them, and that by so much the oftner, as every disorder, though not inflammatory, should nevertheless be compared with inflammations by young practitioners, both in physic and surgery. For we are to observe, that in health the circulation is sedate and uniform, and that when it is augmented above this standard, there is an inflammation or a disposition towards it; and that when it is below it, there is a debility or want of motion, from whence proceed various diseases, which may be more easily known and cured, by comparing their causes and effects with those of health, and those of inflammatory disorders; for by acquiring a true knowledge of the effects of the latter in the doctrine of inflammations, and also of the medicines whereby they are removed or prevented, no one in the least conversant in the materia medica,

can

can be at a loss to relieve the complaints arising from the former, by their opposite remedies. This method may be of some consequence in practice; for I have heard many Professors of physic, remark, that students most commonly acquired a knowledge of the symptoms, and cure of inflammatory disorders sooner, and with less study than of any other; they may, therefore, by observing this method, come to a more clear and certain knowledge of such disorders as proceed from debility or want of motion, than by any other method whatever; for it is by what we know best, and most clearly, that we can form clear ideas of what we know but obscurely.

BOERHAAVE, for the simplicity of his method in tracing out and distinguishing disorders by their causes, is deservedly accounted by all people

ple to be the light and ornament of modern Physicians. Mankind is under no less obligation to Van Swieten, his learned commentator; but it will appear from what follows, that they are both wrong in what regards the doctrine of inflammations.

THE first fountain of error I have discovered in their doctrine, springs from the different series of vessels, wherein they have both placed the different kinds of inflammation. The diversity of humours which occasion these different kinds, fill up the second fountain; and the third arises from the different causes to which this disease is attributed.

BOERHAAVE divides the arteries into sanguiferous, serous, and lymphatics, and says, that an inflammation always takes place in these arteries, because the blood passes in them, as
it

it were, from the base of a cone to its apex ; and that it never attacks the veins, because the course of their fluids is from the apex to the base, unless the circulation is stopped in them by compression. He says also, that the serous arteries arise from the most minute ramifications of the sanguiferous, and the lymphatic arteries from the most minute serous arteries ; and that the serous arteries are smaller than the sanguiferous, but larger than the lymphatic arteries, and that the blood is thicker than the serum, and the serum thicker than the lymph.

FROM these three sorts of humours, and three different series of vessels, Boerhaave and Van Swieten, have deduced three different kinds of inflammation, as a phlegmon, an erysipelas and an œdema. They call the first an inflammation of the first order,

der, and place it in the sanguiferous or ferous arteries; in the first case, they suppose it to be always red, but that in the latter, a sufficient quantity of red blood does not at all times enter the ferous vessels to give it that colour.

BEFORE I enquire into these principles, order requires, that I should mention the true causes of a phlegmon. To know disorders by their effects, is to know them by what they are not, it is the same as to form an idea of a tree we never saw, by its fruit; but to know disorders by their causes, is to know them by the prime attributes which constitute their nature or essence.

Most diseases draw their origin from three efficient causes: The first, which may be called external or evident, produces internally the antecedent

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cedent causes that give birth to the proximate cause, so called, because it exists in the body, and is immediately connected with the disorder. Sometimes two efficient causes concur to produce an ailment, and sometimes one only is sufficient; as in a wound made with the point of a sword. It is of the utmost consequence in the practice of physick, to have the distinction of these causes present to the mind.

THE external causes of an inflammation are fractures, luxations, compressions, aromatic aliments, abounding with oil and sulphur, passing suddenly from a warm into a cold place, and many other external applications which produce their effects, either suddenly or slowly. The irritation, irritability and sensibility of the fibres resulting from thence, are the antecedent causes of this disorder :

order: but it may be properly defined, according to its proximate and immediate causes, *an erethism of the vessels, with the velocity of the fluids preternaturally encreased.*

THE nature and effects of an inflammation, with certain indications, may be clearly understood at first sight of this definition, which will evidently appear, by comparing it with the following one of Boerhaave.

“ 371. Estque sanguinis rubri arteriosi in minimis canalibus stagnantis pressio & attritus a motu reliqui sanguinis moti, & per febrem fortius acti.”

β. I. SEVERAL incoherencies occur in this definition of our celebrated Author; for he supposes a stagnation, an obstruction, a pressure, and an attrition of the same red arterial blood violently moved and agitated in an

inflamed part ; these are indeed opposites which can never subsist together in the same place ; for the inflamed vessels are obstructed, or they are not ; if they are obstructed, the blood must stagnate in them, and remain without motion ; on the contrary, if they are not obstructed, an obstruction should not be accounted one of the causes of an inflammation, as it is asserted in the foregoing aphorism. Moreover, an obstruction excludes all motion ; for it is a stoppage of one or many vessels, which hinders the distribution of the fluids in the part so affected ; so that it is a gangrene in miniature, with this difference, that the obstructed matter does not destroy the vessels, so soon as the former ; but every one believes, that a gangrene excludes the distribution of the fluids in the affected part ; therefore it follows very plain, from the true notion
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on we have here given of an obstruction, that the same must happen wherever it takes place.

β. 2. It cannot be understood how the fluids can stagnate in the capillary vessels of the human body. Water is said to stagnate in a pool, because it is confined there in a certain space, from whence it cannot move backward, forward, or laterally; it has no other motion, but that of fluidity, that is, a facility which its particles have of slipping easily one over another; but if there were only a few drops of water in the pool, certainly they could have no motion of fluidity; they would remain immoveable in its bottom; therefore, in order they should have their natural motion of fluidity, it is necessary there should be a certain quantity of water placed under them,

over them, before them, behind them, and laterally. Besides the particles of water having little or no cohesion together, must certainly be more fluid than those of the blood, especially in a state of stagnation.

FROM the nature of fluidity now explained, we can easily judge, that it is impossible a few particles of blood impacted and stopped in vessels, whose diameters, according to Van Swieten, are not equal to the tenth part of that of a hair, could preserve their fluidity. It will appear still more impossible, if we consider the cohesion and glutinous tenacity of the blood globules, which, joined with the heat excited in the capillaries by an inflammation, would soon render their stagnating fluids as hard as an extract. Hence we see, that a stagnation of the humours

mours in the capillary vessels, no less excludes motion than an obstruction.

β. 3. OUR Author supposes the obstructed or stagnated blood to be violently moved by attrition. Indeed, he might as well say, that the blood was at rest, and violently moved at the same time, which are two contradictories.

HENCE it is evident; that the doctrine of inflammations, which may be reckoned the basis of physic and surgery, has been founded hitherto upon a contradiction, and received as a truth by most of the Physicians and Surgeons in Europe. This, among others, may be the reason, why some were not ashamed to own that their art was founded upon uncertainties sufficient of themselves to discourage any one from inquiring into its principles.

FOR the future, it is to be hoped, that both physick and surgery will be freed from this aspersions, by the rational and experimental principles, whereby, I am to account for the various effects of an inflammation.

BOERHAAVE and Van Swieten, often mention the red blood going into the vessels of the eye, in order to prove, that an inflammation is occasioned by a stagnation and an obstruction; but this example proves nothing in favour of their assertion; for any one, who attends to the works of nature, may easily see that there was something prior to the redness of the eye, which occasioned a greater column of fluid than usual to come into its vessels. Sometimes a sympathy with some ailing part of the body, an air, a stinking effluvium, and very often a fluxion of some acrid humour may occasion a redness
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in the eye ; but these are only external or antecedent causes, which, by irritating and exciting an unusual motion in the vessels of the eye, occasion so great a quantity of fluids to run into them, as to produce a redness ; it cannot therefore be supposed, that an obstruction or a stagnation in such cases, may be the proximate cause of the redness of the eye. Moreover, it cannot be conceived that the blood could stagnate in the vessels of this organ for weeks, months, and sometimes years, as we see in blar-eyed people ; it is therefore probable, that the blood circulates all the time ; otherwise it cannot be comprehended how the eye could recover its native colour, when the irritating cause is removed by the power of medicines. But of this, I shall speak more at large, in Sect. 3.

Now

Now as it is proved, that an obstruction or a stagnation of the humours, cannot be reckoned a proximate cause of inflammations, I am to prove next, that it cannot be produced by the increased velocity of fluids alone, which the celebrated Van Swieten, holds to be one of its proximate causes in his commentary on Aph. 371; and which, Dr. Sauvage maintains to be the only one; for it cannot be conceived how the velocity of the fluids can be increased without the concurrence of other causes; even if it could, it cannot be understood how it could bring on an inflammation. Canals, and banks of rivers contribute nothing towards the rapidity of the currents; but we cannot infer from thence, that the like happens in the canals of the human body; for when they become any way inactive, as for example, in a dropsy, the Patient

ent is soon destroyed, unless he gets speedy relief from his Physicians. Where then can we trace out the cause of this velocity given by our Author to the fluids? We must not feign things we cannot see; for all the rivulets of systems, and hypotheses are stopped at their source, since physic is defined an art and a science, founded upon reason and experience, &c. therefore, we must seek for it in the *penetralia*, or inward recesses of nature; but in order to succeed in our search, we must give strict attention to the different changes, which, upon every accident of life, happen in the human body; thus for instance, by the pricking of a thorn, or needle, by the stinging of Bees, Wasps, by fire, the venereal disease in gonorrhœas, &c. by each of these and such like causes, are produced all the genuine effects of an inflammation,

mation, as pain, swelling, heat, redness, &c.

Now, no obstruction or stagnation of humours, can be supposed in the affected parts; therefore, the effects of an inflammation, may proceed at least, occasionally from a stimulus; I say, occasionally, because a stimulus could produce none of the foregoing effects in the vessels of the human body, if they were not sensible and irritable.

AN irritation and its effects are greater or smaller, according to the force of the stimulus, and sensibility of the affected part. That mode of action, which results from the sensibility and irritation of the vessels, I call an erethism, this action is neither peristaltic, nor oscillatory; it is different in the small-pox, the measles, the itch, &c. it varies according

cording to the stimulus ; so that there are as many kinds of it, as there are stimuli in *rerum* natura ; because different stimuli make different impressions, that excite the vessels to so many different kinds of erethism, which are attended with as many different disagreeable sensations.

FROM the foregoing examples of the pricking of a thorn, of a needle, stinging of Bees, &c. it is evident, that whenever an erethism is excited in the vessels of any part, an increased velocity of the fluids must necessarily follow in that part, and that by taking away these two causes, we take away the inflammation. This will appear more clearly, by what I am to say, in the sequel of this section, concerning heat, a tumour, and the other effects of an inflammation.

THE

30 *Of a PHLEGMON.*

THE chief effects of an inflammation are heat, pain, a swelling, redness, and the acceleration of the pulse, which I am now to explain one after another.

β. 4. ACCORDING to Boerhaave's doctrine, the production of heat in the inflamed capillary vessels; cannot be accounted for; for it consists in the reciprocal action, and re-action of the solids and fluids, which is manifested in running Footmen, working People, &c. but the fluids are at rest and obstructed in these vessels, according to the hypothesis of our Author, and heat is always diminished in such as have obstructions, as we know by a very observable case in a young Woman labouring under a chlorosis; and, therefore the production of heat in an inflamed part, cannot be accounted for, if we admit the definition which Boerhaave gives

gives of an inflammation, in Aph.
371.

§. I. SOME may object, from what is said in this paragraph, that Boerhaave attributes a greater velocity to the fluids contained in the vessels of the inflamed part which are not obstructed.

THESE unobstructed vessels are inflamed, or they are not; if they are inflamed, our Author has no reason to assert, that an inflammation has for its cause, an obstruction of these vessels; if they are not inflamed, the objection is not against us.

THAT the various effects of an inflammation, and what I am to prove in the sequel of this work, may be easily understood, I find it necessary to premise a physiological explication of the mechanism of animal heat;
and

and for that end, I shall first explain the two-fold motion of the blood in the vessels of a living body ; for every minute drop or particle of it moves round its axis, and advances with a progressive motion, from the heart to the extremities of the body, and back again.

LET us first, in imitation of all Authors, call the minute drops of our humours, globules, and let us imagine, a tube pressed on all sides, containing an infinite number of these globules, all unequal, infinitely small, and moved according to all directions. 2. Let us suppose, the humours of a human body, during their actual state of fluidity, to be capable of such motions as Sir Isaac Newton has proved all fluids are susceptible of. 3. All Authors allow the whole mass of our humours, to consist of globules of different

ferent sizes and densities, as the blood, for example, the serum, the lymph, &c. 4. Let us suppose the fluids in any vessel of the human body pressed by the skin, the muscles, the external air, and by the other contiguous vessels.

FROM these premises may be easily understood, that every globule of that fluid must receive impulses from the skin, the muscles and the lateral tubes, its very weight and elasticity, from anterior, posterior, and lateral globules, and lastly, from the different situations and motions of the body; therefore, it receives shocks or impulses, according to innumerable directions; but, by the laws of mechanics, when a body receives impulses in that manner, it should yield to them all, as much as possible, and be moved according to their different directions; there-
D fore,

fore, as every globule of blood receives impulses in every point, it should yield to them all, and of consequence move round its axis, as long as it receives them after the manner here described; but it receives them thus whilst the heart moves; therefore, every globule of our humours moves round its axis, at least, in the large vessels, until the motion of the heart ceases. This motion of the fluids round their axis, by the superior force of the heart impelling the posterior globules, becomes progressive; for it is a law in mechanics, that when a body receives impulses from different powers, according to different directions, it should move with a progressive motion, according to the direction of the strongest; but of all the the powers acting in the blood vessels, the impulse of the heart, communicated to the posterior globules, is

is the strongest ; therefore, all the globules contained in the vessels of the human body, should be moved according to the direction of the heart, with a progressive motion ; the same may be said of the other humours, as they are equally subject to the same laws of motion:

WE are indeed to remark here, that it cannot be conceived how the globules of our humours can move round their axis in the capillaries, where only one globule can enter at a time, by every suction and attraction, which is the only way the circulation can be carried on in these vessels ; because they have no perceptible systole nor diastole. We allow the propelling force of the heart behind to concur, in as much as it conveys the fluids to their orifices.

It may be easily concluded from what is said, concerning the two

different motions of the blood, that the heat of the human body, consists in the repeated action, and re-action of the solids and fluids, and as these are augmented in an inflammation, the excess of heat in this disorder may be easily accounted for, according to our doctrine; for the velocity of the fluids being preternaturally encreased, (which we hold to be one of the proximate causes of that disease) the contraction of the heart must at the same time be more frequent and strong, and consequently the action and re-action of the fluids and solids, augmented accordingly, and produce heat. On the other hand, it cannot be denied, but all living creatures have an instinct which excites them to use the utmost of their power to remove the cause of pain; for the first law of nature is to seek food to preserve life, and the second to avoid, as much

much as possible, any thing which might destroy it; and indeed we find, that the heart observes this second law inviolably upon all accidents.

It is by this instinct or sympathy, that when any part is irritated, the heart directs to it immediately a quantity of fluid proportionable to its irritation, by which its vessels are dilated and contracted with greater force; and consequently their tabulæ or sides must approach one another, and repel the fluids which rally in their turn, and thus successively their motion round their axis, with their progressive motion, is accelerated, and becomes more rapid in proportion, as the blood abounds with oil and a sulphureous principle, or other elastic particles which are easily put in motion and warmed. The heat arising from such

blood is soon diffused from the heart, as the center of motion, through the vessels to the circumference of the body, in the manner of rays, *quasi per irradiationem.*

THE force, by which the erethism impels the fluids against the sides of the vessels, is, as it were, a proportional medium between their irritation and contraction. As that force is various, according to the variety of the stimulus, and to the addition it receives successively from the preternatural velocity, elasticity and quality of the blood, it produces also various degrees of contraction in the vessels, and consequently various degrees of heat. From hence, and from the notion I have given of an erethism, (page 28) it may be easily understood, why one degree of contraction brings on a small inflammation, another a great one, a
third

third suppresses the excretions, as it happens in an ardent fever; how, by another degree some excretions are increased, as when sweat or spitting is brought on by a slow erythism, in some hypocondriac habits; and lastly, how the contraction may sometimes be so violent as to cause convulsions.

No Artift was ever found ingenious enough to contrive a machine, which could perfectly represent the circulation of the blood in a living animal; yet, Physiologists are allowed to use such evident examples as they are supplied with from experimental philosophy, in order to clear up some cases, which are not immediately obvious to the senses; I shall for that reason, make use of the following experiment, that it may help to render my physiological account of heat more intelligible; and

that the consequences and corollaries deduced from thence, may be more easily comprehended.

LET glass reduced to powder, water and oil be agitated with a vehement motion in a glass vessel, the particles of glass being the heaviest and most dense, advance with a progressive motion to the circumference of the vessel, leaving the oil and water behind at the axis and center; but the contrary happens, when the motion is less vehement.

LET the center of the glass vessel represent the heart; its circumference that of the human body, and the different substances it contains the different humours of a living animal; and allowing the circulation to be carried on, by the like mechanism, the blood being heavier and more condensed than the serum
and

and lymph, will leave them both behind, when by a vehement motion, excited by an erethism, they are propelled all together to the inflamed part, where the blood produces irritations in proportion to the different contractions of the vascular system. It may be inferred from thence, that in every degree of inflammation, a greater quantity of red blood than any other humour must come to the affected part; and that it cannot be conceived, how an erysipelas and a hot œdema, can be formed by any humour different from the red blood, as Boerhaave and Van Swieten assert, in Aph. 380.

LET it not be imagined, that this conclusion is merely hypothetical, and entirely founded upon the fore-mentioned experiment; for we may see the truth of it proved by almost every accident which happens to the human

human body, as I have constantly observed for many years past, by attending diligently to the changes which follow, when it is either hurt or irritated by external causes; upon all such occasions, a redness ensues similar to that which arises by running, dancing, singing, or on using any other violent exercise, or on the prick of a thorn, the sting of a Bee, a stroke, &c; so that every such accident of life proves, that a greater quantity of blood is determined to an inflamed part, than any other humour. We may also learn from the same principles, why, in an ardent fever, and in all inflammatory disorders, the blood propelled more frequently to the circumference of the body, should there press the origin of the serous and lymphatic vessels, and occasion an exsiccation of the skin. On the contrary, when the motion of the fluids is in a natural

tural state, the serum, lymph, and the humour of insensible perspiration, leave the blood behind, and come in a greater quantity towards the skin; from whence its whiteness, softness, and humidity must necessarily proceed.

SOME Authors maintain, that the subtil matter of our atmosphere, is the chief agent which carries on the circulation of the animal fluids, produces heat, muscular motion, &c. Although, what can be said on this subject, borders too much on hypothesis, to deserve a place in a work, whose object is the preservation of life, by rules founded on facts; it may not, however, be improper to entertain the Reader a few moments with my opinion, and compare it with that of some eminent Authors, who have most seriously considered it.

MANY

MANY Physiologists suppose the different kinds of matter which float in our atmosphere, and which escape our sight, to enter into the blood, and render it more stimulating, and of consequence, more apt to solicit the contractions of the vessels, and produce heat. Among the rest, Bergerus in his *Physiology*, supposes the blood to become more elastic, and to be more easily moved by being mixed with the air, and with the subtil matter which are expanded in the atmosphere. Dr. Whytt, Professor of Physic in the University of Edinburgh, seems to suppose the same; for he enumerates the acid of our atmosphere, among the causes of circulation, and the action of the muscles, in his elegant treatise on animal motion. Some arguments now occur to me, for and against these systems.

THE

THE existence of subtil matter in our atmosphere, is proved by the experiments of electricity; by the increased weight of antimony in the focus of a burning glass, and by the circulation of the magnetic effluvia, from the arctic, to the antarctic pole, of which Mariners no more doubt, than of the air's existence in violent storms. The existence of an acid in our atmosphere, has been proved by the honourable Robert Boyle, who, by exposing to the air the different bodies, which have an affinity with particular acids, found that the atmosphere of London abounded with the acid of sulphur; and it is more than probable, that the atmosphere of every country is impregnated with some kind of acid.

FROM these premises, we can reason thus; it is known by experience, that the human body placed in a watery

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watery atmosphere, swells by absorbing water; in like manner, mercurial ointment applied to the soles of the feet, ascends to the salival glands. It cannot be denied, but the air, the acid of sulphur, the magnetic and electric effluvia, are much more subtil than water or mercurial ointment; therefore, it may be analogically inferred, that these fluids circulate with the blood. If they do, the electric matter, by its nature, (for it is supposed by many to be the same as the matter of fire or light) the magnetic effluvia by attraction in the capillary vessels, the air by its elasticity, and the acid of sulphur by its stimulus, must all concur to augment the action and re-action of the solids and fluids, and produce heat.

The froth of the blood coming out of the vessels proves that it contains

tains air, and the volume of air extracted from it in the receiver of the *machina pneumatica* is three times greater than its own. This seems to prove, that the air circulates with the blood; but it cannot be easily conceived how the sides of the vessels could resist the force of the air, if it were condensed to that degree, and could at the same time exert its elastic and expanding force; besides the fluids are incompressible, or if they be not, as some ingenious Gentlemen have often attempted to prove, they must be compressible in so small a degree, as not to admit air as elastic; for if it were elastic, its globules by attraction would unite, and in a short time stop the circulation; moreover, it is proved, that an elastic air cannot penetrate capillary vessels of glass; but the blood vessels are much more

more minute, than capillary vessels of glass ; the air, therefore, cannot penetrate them without laying aside its elastic property.

How can it therefore happen, that rheumatic pains and swellings are produced in all parts of the body, even in the strongest and most robust habits, by wind or an expansion of air, as some grave Gentlemen confidently assert ?

Nothing that we know can stop the magnetic effluvia in its course from North to South ; it cannot therefore be understood, how it can circulate with the blood ; we have no better proof to convince us, that the electric effluvia or the matter of light, mix with the animal fluids.

FROM the chymical analysis of bile, and that of urine, we know,
that

that a sulphureous principle is contained in the humours of the human body ; for the smell of the salt extracted from the two former, proceeds from thence. But we have no proof, that this principle is absorbed from the ambient air, neither have we any occasion for such a subterfuge ; for our aliments supply it very copiously.

MR. BOYLE asserts, that among the different particles of matter, which float in the atmosphere, there may be some so minute, so solid and shaped after such a manner, that they may enter the orifices of the cuticular glands and the other pores. Hence may be understood, why the plague (of which Cardanus speaks) that reigned at Basil, spared the Italians, French and Germans. Boerhaave, in his chymistry, concludes from thence with our noble Author,

E that

that the pores of these People were so formed, that the pestilential effluvia could not penetrate them, whereas it found an easy entrance into the Citizens and Natives, whose pores, by length of time were made to correspond to the figure of the subtil particles of matter which floated in the atmosphere, in the same manner as iron placed for a long time in the pinacles of churches, acquires magnetic properties.

FROM these premises, we may conclude, that neither the air, nor any other particles of matter expanded in the atmosphere, can enter the blood without being so intimately combined therewith, as to assume its nature, and lay aside in some manner some of their own properties. It is thus, *sal ammoniacum*, when united with the mucous and
gela-

gelatinous part of the blood, in a state of health, is imperceptible.

EVERY Physician will grant, that the particles of matter which float in the atmosphere, exist in all vegetables and animals, as elements; and it is in that sense, I allow, that they contribute to produce heat in the human body. We are to remark, that the elementary particles which cause heat, are unequally distributed in vegetables even of the same species, according to the climate and soil which produce them; as we see manifested in wines of different countries and different soils: The like inequality may be constantly observed in the different classes of mankind, which, according to the goodness of their climates and aliments, are more or less subject to inflammatory disorders, and the preter-natural effects which general-

ly arise from too much strength or heat in their constitutions.

β. 5. Now as we have proved, that an inflammatory heat cannot be accounted for according to Boerhaave's doctrine, it is not to be admired, that by the same principles, we cannot be enabled to explain, how a tumour can take place in the capillary vessels of an inflamed part. For in that case, their diameters ought to be enlarged, a thing impossible, on account of an attrition of their fluids, which must cause their sides to approach one another; and of consequence lessen their diameters, and rather diminish than augment their quantity of fluid, on account of the repeated contractions whereby an attrition is carried on. Besides, our Author supposes an obstruction in the inflamed capillaries, which, as we have said above, excludes

cludes all motion ; but a hot tumour cannot be formed in any part, without an excessive great motion of the fluids ; therefore, an obstruction, and the sort of motion on which an attrition depends, rather hinder than bring on a tumour in an inflamed part.

§. 2. OUR adversaries may object, that we can give no reason why the sides of the vessels should come together in an attrition.

AN attrition, in what ever sense it is taken, arises from the frequent contractions of the vessels ; but in contracting themselves, their sides must certainly approach one another ; and their diameters of consequence must be lessened, and this must happen constantly so, from a state of inanition to the most supreme degree of a plethora.

ALL Physicians know that a plethora ad vasa often proceeds from an attrition of the fluids ; for when this is carried on to a certain degree of intensity, the humours are so triturated thereby, as to occasion sometimes a rarefaction, and an intire decomposition of their component particles, as Practitioners may frequently observe in blood drawn from inflamed Patients.

WHEN the attrition of the animal fluids languishes or is intirely wanting, the circulation of the blood, and the rest of the functions languish also ; as we see in a young Girl labouring under a chlorosis, or in such as are cachectic, or weakened by chronic disorders.

INDEED a swelling is not essential to an inflammation, as some Authors affirm ; for the intestines are sometimes

times converted by this disorder into dry, thin, yellow or black membranes, which I saw often verified by opening bodies whose deaths were occasioned by inflammations of the abdomen. And in scrophulous and venereal disorders, there is sometimes a slow erethism, with a preternatural velocity of the fluids without any apparent swelling.

§. 3. It may be objected against what I have said in this paragraph, that in an inflammation, the vessels are distended with a greater quantity of blood than in a natural state; and that of consequence a tumour must, in some sense, be essential to that disorder.

IN many bodies who died of inflammations, I saw the intestines and lungs reduced to very small bulks. I saw also the bodies of consumptive
and

and phthifical People covered over with ulcers, without any appearance of a tumour; but ulcers do not come without a previous inflammation; therefore we can assert, that an erethism of the vessels with an encreased velocity of the fluids, can exist in a part without a tumour; and that of consequence, a swelling is not essential to an inflammation. If it were, a sensation of pain could never happen without drawing an afflux of humours to the affected part to raise a swelling; but every one knows the contrary by experience; for in a tooth-ach there is very often an exquisite pain without a swelling.

A SWELLING which proceeds from an echymosis is caused by a rupture of the vessels; but it cannot be supposed that they burst in a simple inflammation; otherwise how could the fluids stagnate in them, as
Boer-

Boerhaave asserts ? in a perfect contusion, as the circulation ceases in the contused part, it must grow stronger and more frequent in the collateral and subjacent vessels ; from whence arises very often an inflammatory swelling, which some Authors, without any foundation, attribute to a stagnation of the fluids in these vessels.

THE swelling of an inflamed part is easily accounted for, according to our doctrine ; for whenever the erethism of the vessels with the velocity of the fluids is preternaturally increased, the action and re-action of the fluids and solids being more frequent and strong, the vessels by their continual agitation and distension are weakened, lose their tonic and contractile force, and by that means their pores become so enlarged, that the humours can easily pass through them

them into the cellular membrane, and produce a swelling which will be proportionable to the strength and duration of the erethism, and the preternatural velocity of the fluids.

WE are to remark that the vessels, muscles, and membranes, with every sensible part of the body, have a natural tendency to shorten themselves, which by Physiologists is called a tone or tonic action ; it is so much augmented in an inflammation, that the pores and orifices of the capillaries become so narrow, that little or nothing can pass through them ; but when this action is overpowered by too much distension, or by the vehement impulse of the fluids from behind, the fibres are somewhat lengthened and relaxed, and the pores become so wide, that the humours can easily pass through them into the afore said membrane.

membrane. The force of the stimulus and erethism may be so great, as to overcome this action in an instant, and cause a swelling, &c. as in β . N°. 3, 4, 5, 6, 7, 8. This action supports us when we are awake, and it is so much lessened by sleep, that it is partly on that account we are something taller in the morning than going to bed. In a palsy the mouth is drawn towards the healthy side, by a tonic contraction, and not by a muscular motion, as many Authors pretend.

As Dr. Haller, Professor of Physic in the University of Gottingen, has proved by the authority of Sir Clifton Wintringham, that the capillary vessels are much stronger than their trunks, it cannot be conceived how a swelling can take place in them, especially in an inflammation, wherein their bulk and diameters are lessened by their tonic action and erethism.

See

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See what is quoted from Dr. Haller, Sect. II. Φ . 6.

β . 6. As the redness of an inflamed part proceeds from the encreased velocity of the blood, it cannot be accounted for according to Boerhaave; because in Aph. 371, he supposes the fluids to stagnate, and remain without motion in the inflamed arteries. The same thing may be said of pain and the acceleration of the pulse; because they are no less the immediate effects of an inflammation than redness, as appears from the application of the definition I have given in the beginning of this section.

WHEN any part of the human body is irritated, the heart sends it so great a quantity of blood, that it will soon cause redness, &c. as in β . N^o, 1, 2, 4, 5, 6, 7, 8, of this section,

tion, if the cause is not removed or overcome by nature or art.

§. 7. PAIN is a disagreeable sensation, which excites all living creatures to employ the utmost of their power to remove its causes. The artifice which nature uses to free herself from it, is very admirable; for she seldom fails to send a flood of humours to any part affected with pain, even independent of the will. Pain supposes a stimulus and the sensibility with the irritability of the fibres as antecedent causes; but it arises immediately from an erethism of the vessels, and the impetuous velocity of the fluids, which both combine to irritate and distend these vessels so much beyond their tone, as to cause pain. See page 15.

WE may see what is here asserted confirmed in Quadrupedes, when
by

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by a natural instinct, they contract their *tunica comosa*, to drive away the flies.

β. 8. THE stricture and erethism of the vessels is greater in proportion to the intensity of the inflammation, and of consequence, the quantity of humours is lessened in them, it must, therefore, be encreased in their collaterals. In the mean time, the heart, according to the laws instituted by provident nature, doubles its contractions, in order to free it's subservient vessels from their stricture and erethism; hereby the action and re-action of the solids and fluids become stronger and more frequent, and consequently the pulse must be accelerated.

S E C T.

S E C T. II.

Of an ERYSIPELAS.

AN Erysipelas, according to Boerhave, is an inflammation of the second order. Before I explain this celebrated Author's opinion, I will present my Reader with what Fernellius has collected from the Antients on that subject.

“ ERYSIPELAS, ardor est vehemens per corporis summa diffusus. Nec tumore manifesto extuberat, nec partem attollit aut distendit, nec penetrat in subjectam carnem, sed late diffunditur nulla collectione circumscriptum. Quamcunque partemprehendit, vehementer mordicat
&

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& urit: color inest ex rubro flaves-
cens, qui pressu subterfugit, moxque
redit. Dolor nec pulsans nec admo-
dum vehemens est. Quum fluxio
excutitur, horror quidem ac dein fe-
bris hominem adoritur: ac sæpe
quum in crura irruit, ab inguinis tu-
more initium ducit. Serpit id qui-
dem herpetum more, atque priori
derelicta sede, in vicinas partes sen-
sim obrepit. Est autem duplex,
unum quod simplex erysipelas Celso
appellatur, solo rubore & ardore,
nulla exulceratione molestum. Al-
terum quod eidem sacer ignis nun-
cupatur estque exulceratum erysipe-
las. Hujus duæ species sunt, una
qua summa cutis sine altitudine ex-
ulceratur, in qua & crustulæ instar
furfuris excitantur: altera cujus ex-
ulceratio altius in cutem penetrat,
e qua ruptis pustulis purulenta sanies
exit. Simplicis erysipelatis origo
est

est a fervente tenuique sanguine, qui biliosus appellatur: exulcerati vero ex eo cui bilis supervacuæ ejusque incalescentis nonnihil sit admistum. Is e venis tenuioribus propulsus nequaquam in carne subsistit & hæret, sed tenuitate in cutem fertur & evolat, quæ densior & compactior hunc retinet cohibetque. Quumque tenuis sit humor facile dispergitur, neque in conspicuum tumorem se attollit. Genus hoc universum exquisitum est erysipelas: quod vero phlegmonodes appellatur, tumentius quidem, sed minus fervidum existit multoque minus oedematodes." Vide Fernel. De extern. corp. affect. cap. 4. lib. 7. Pathologiæ.

Φ. I. WHEN an inflammation does not penetrate deeper than the integuments, and causes no apparent swelling, it is called an erysipelas,

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not

not only by Fernellius, but by all the Antients and Moderns.

Φ. 2. A SIMPLE erysipelas manifested by a redness and parching heat, can hardly be distinguished from an exquisite phlegmon; for it has all its characters except a tumour, but I have shewed in the foregoing section, that a tumour is not essential to an inflammation; nor has our Author any reason to assert, that it proceeds from a bilious blood, for the bile is not red; yet this disorder may happen, when the bile is of a bad quality, or when it is diffused over the surface of the body.

Φ. 3. OUR Author, as all the Antients and most of the Moderns have done, concludes, that the yellowish colour of the part affected by an erysipelas proceeds from the bile;

bile ; but I have observed very often, that this colour does not appear until the disorder is upon the decline, either towards a resolution, or a supuration. Van Swieten attributes this yellowness to the serum, in his Commentary on Aph. 390. But to prove this assertion, it would be necessary, that nature should send the serum only to the affected part ; but it cannot be conceived how that could be effected according to the known laws of the animal œconomy ; for we know by experience, that such as labour under this disorder, are no way disposed to sweat, nor have any moisture perceivable on their skin ; on the contrary, they appear to the touch to be dry and parched, and burn all over with heat ; and it follows from what is said in page 41, that the heart in that situation, cannot be disposed to separate serum from the blood to

be sent preferably to any other humour to the irritated part; for which reason, it is not more likely, that a yellow colour in an erysipelas should rather arise from the serum than from the blood.

NEITHER the blood nor any other humour is black; but when collected in contusions, they take on that colour; may not therefore the blood decomposed by the heat and pulsation of an inflamed part, change its colour from red to yellow? Besides, as the red blood is thicker than the serum, it cannot so easily pass off by resolution; therefore, it should be more retained in the affected part than the serum. Moreover, we are to remark, that Leuwenhoek observed the colour of the blood to proceed from the union of the white globules; therefore, that union being dissolved by the rarefaction arising from

from an inflammatory heat, may occasion the red colour to vanish partly or entirely, which, perhaps, happens in the present case; and this is further proved by Dr. Sauvage, in his *Physiology**, where he says, that the redness of the blood proceeds from its thickness, and proves it by the authority of Sir Isaac Newton, who has demonstrated, that bodies were red, because the thickness of their particles was equal to $\frac{1}{15,000,000}$ of an inch; that they appeared yellow, because they were equal to $\frac{1}{20,000,000}$ part of an inch, and to appear black, if one, &c.

ALL Physicians allow, that an erysipelas is never produced without a preternatural encrease in the motion of the fluids, and for that reason, it is not certain, that a greater

* Vide, pag. 179 and 199.

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quantity of serum is sent or derived to an inflamed part, than what commonly circulates with the blood, See β . 2. of this Section.

Φ . 4. ALTHOUGH an erysipelas causes no manifest swelling or distension, yet we know by reason and experience, that it seldom can happen in any external part of the body, without attracting to it a greater afflux of humours than what is propelled to it by the common laws of circulation in a healthy state; and that of consequence the part must swell in some measure, except in some consumptive habits, wherein the radical moisture is exhausted, and the *vis vitæ* is unable to propel the fluids to the circumference of the body, or in those in whom the sebaceous humour is entirely wanting.

Φ . 5.

Φ. 5. As it cannot be comprehended, that an ulcerated erysipelas can exist without pain, we can conclude from these remarks, that Fernellius supposes an erysipelas to be attended with heat, redness, swelling and pain, which, according to Celsus, are the four chaisteristics of an inflammation.

Φ. 6. WE have remarked under Φ. N^o. 5. Sect. 1. three series of vessels through which the blood or any other humour is to pass, according to our Author, before it can work its way into the cellular membrane to form an inflammatory tumour. Fernellius seems also to have hinted here, that these three series of vessels are continued one into another, and that the humours cannot pass from the first and second into the cellular membrane, or empty spaces, as he calls it; but if every

part of these two series as well as the third, had not inspiring and expiring vessels and pores that open into the cellular membrane, there could be no supply of oil or moisture to preserve the sensibility of the nerves, veins, and arteries, and the flexibility and elasticity of the muscles, tendons, ligaments, and cartilages; they would soon grow stiff and break by the least motion, just like a twig, which withers by being long exposed to the sun, and breaks before it can be in the least bent.

I HAVE observed, that many People who were long subject to scorbutic or venereal complaints, break their limbs by very small force, which must certainly be owing to the want of that oily balsamic humour, that passes in a state of health from the vessels not only into the cellular membrane, but even into the

the substance of the bones. But when the vessels are attacked by a slow continued erethism, as in the aforesaid diseases, this balsamic humour cannot always pass, and when it does, it grows acrid, or evaporates before it can get a supply ; because the erethism or action of the vessels is very irregular in such People, on account of the great changes which the non-naturals produce in their infirm bodies.

FROM these examples, we may venture to say, in conjunction with Helmontius and Hippocrates, that every part of the body, both inward and outward, and consequently of the vascular system, is inspirable and expirable ; it is therefore reasonable to think, that there are pores through the whole length of the vessels, by which a humour passes into the cellular membrane, when

when the circulation is in a natural state; it is therefore probable, that when the tonic action of an inflamed vessel is weakened or abolished in any part by too great a distension from plenitude, the pores may become so wide in that part, as to admit the red globules or other humours to pass through them into the cellular membrane.

For which reason, it does not seem necessary to suppose, that the morbidic humour in an inflamed artery should pass through its extremity before it can get into that membrane. Besides, by what Dr. Haller extracted from the experimental enquiries of Sir Clifton Wintringham, it appears, "that in general the trunks of the arteries are in all parts of the body weaker and the branches stronger in their coats; whence the impulse of the blood may exert a
con-

considerable effect upon the former, but least of all on those of the limbs.

FROM hence it is, that aneurisms are most frequently formed near the heart ; for in the lower extremities, the strength of the arteries and of the veins too is much encreased.

AND the proportion of the arterial membranes or coats in thickness, with respect to their bores or capacities, is greater as the arteries grow less, and is thickest in the least of them, which can transmit only one globule at a time. The truth of this is proved from anatomy; and the forcing of air into the arteries, by which they burst always with more difficulty as they are less ; and from the calculation itself, by which the magnitude of the least arteries is determined from the globules, distending

tending their two semi cylindric membranes,

ANATOMISTS have erroneously supposed the strength of the arteries and veins to decrease, in proportion as they grow less in thickness, for by experiments, it appears, that the thinnest vessels have often a much greater degree of compactness and strength proportionable than the larger; and some whose coats are extremely thin, exceed in strength the aorta, whose coats are ten times as thick. The emulgent artery was found a fifth or sixth part stronger than the aorta at the heart, and the emulgent vein was found two thirds stronger than the cava, &c.* ”

* See remark on § 153, of Dr. Haller's Physiology, containing an extract of Sir Clifton Winttingham's experimental enquiry, concerning the arteries and veins, translated into English by Dr. Mihles.

HENCE

HENCE it is more than probable, that the tonic action of an inflamed artery can sooner be overcome by distension in any point where it is preternaturally distended, than in its apex or extremity, notwithstanding what Fernellius, Boerhaave and all other Authors affirm to the contrary; therefore I see no necessity of supposing the morbidic humour to pass from the sanguineous arteries into another smaller series of vessels, to form an inflammation by error of place. Why should it not pass rather into their corresponding veins, if the serous or lymphatic arteries be not intermediate between them? if they be, the blood with every kind of humour should always pass through them before it could arrive in the veins. Such an assertion would be very absurd, though it may be inferred from Boerhaave's way of reasoning in the following aphorisms.

“ 372.

“ 372. QUODQUE ergo fieri potest vel in finibus arteriosis, vel in vasis serosis lymphaticis aliisque minoribus, arteriosis dilatatis osculis admissos globulos rubros aut alia fluidi elementa crassa, per fines transmittere non potentibus. Si sanguis transfunditur in eas venas, quæ spiritibus accommodatæ, inflammationem excitat. Cels. 5.

378. EFFICIUNT eam in vasis lymphaticis arteriosis. 1. Omnes causæ, quæ initia horum latiora ampliant, ita, ut in ea intrent partes sanguinis crassiores, quæ propulsæ ulterius occurrunt angustis conniventibus, ubi tum patiuntur eadem, quæ exposita (377); talis est laxitas vasculi in suo principio, motus violentus liquidi arteriosi: 2. Omnes causæ alteri inflammationi communes.

375. 376.

379.

379. Unde et similis morbus in omni vase conico, ubi fluit ex lato in angusta liquor, obtinere potest ; ut enim in sanguine rubro sic in lymphâ alia est forte pars crassior reliquis.

380. Ex quibus vera diversitas phlegmones erysipelatis, oedematis, schirri cum inflammatione liquet."

β. 1. An artery, according to Boerhaave, is like a cone whose base is in the heart, and *apex* in the extremities of the body. An erysipelas takes place nearer the *apex* of the cone than a phlegmon, and it advances sometimes as far as the lymphatics, where it is produced by error of place. The serum, according to this Author, is yellow, and in his Commentary on aph. 127, says, that in the serous arteries there may be a
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red or yellow inflammation, the first happens by error of place, the second is peculiar to these vessels.

IF a little cruor with much serum stagnates in the pellucid vessels, which are obstructed and inflamed, the affected part will then appear of a reddish yellow, and this sort of inflammation he calls an erysipelas.

HENCE also appears the affinity betwixt an erysipelas and a phlegmon, since they only differ in the magnitude of their obstructing particles; for in a phlegmon the red part of the blood is accumulated in the obstructed and distended vessels; but in an erysipelas, the serum of the blood, mixed with a little cruor, becomes impervious in the same manner; also the seat of a phlegmon is the *membrana adiposa*, whereas an erysipelas invades the external
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integuments of the body, or the internal membranes.

IN this extract we may see what our Author means by an inflammation of the second order proceeding from an error of place; but I will clearly shew by fair arguments drawn from the nature of the solids and fluids, that this doctrine is contrary to reason and experience.

§ 2. It is a well-known truth, that the skin is more or less dried or parched in a fever, according to the vehemence of the symptoms, of which we may daily see evident proofs in an ardent fever. I suppose no Physician will deny, but the dryness of the skin in this case proceeds from the constriction of its vessels, whether they be sanguiferous, ferous or lymphatics; but in an inflamed part the stricture of these

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vessels must be far greater than in an ardent fever; they should therefore exclude not only the red globules, but also the peculiar humours to which they are destined, and from thence become parched and dried.

HENCE we see the reason why a resolution does not happen before an inflammation ceases, and why a moisture is not perceivable on the skin in an ardent fever, before it is upon the decline; it appears, therefore, from this experimental proof, which is obvious to every Practitioner, that in an erysipelas, and in every kind of inflammation, the serous and lymphatic vessels are under so great a stricture by an erethism, that they exclude all kinds of humours, and of consequence all degrees of swellings; from thence we may see, that it is improbable an inflammation can take place in these vessels

fels by error of place. For that reason, we can conclude, that the plenitude and derivation of humours, which happen upon such occasions, take place rather in the sanguiferous vessels, or in the cellular membrane, or in both together than in the former; therefore, it plainly follows, from the nature of the serous and lymphatic vessels, that our Author's doctrine, concerning an inflammation of the second order, is contrary to experience.

β. 3. IN page 41, we have proved, that the blood as being grosser than the serum or lymph, should come in a greater quantity than either of these to an inflamed part, and that the thickness of the humours in this case, is in proportion to the force of the inflammation; these are immediate consequences of the laws of secretions;

for it is allowed by all Physicians, that the motion or force of any organ in the human body is greater in proportion, as it is nearer to the heart ; therefore, the humours secreted in them will be thicker, according to their distance from that center of motion.

HENCE may be understood, why the urine secreted in the kidneys, and the bile secreted in the liver, should be much thicker than the animal spirits, and the humours which in a state of health, pass off by sweat and by insensible perspiration ; because these three last are secreted by organs much more distant from the heart than the liver, or kidneys ; but the action of the solids is preternaturally encreased in every inflamed part, therefore, the humour derived to it will be thicker in proportion to the violence of that action ;

action ; but the thicker it is, the more it irritates and constricts the capillary vessels, until it shuts them up so close, that it cannot enter their orifices ; it follows, therefore, from this argument drawn from the nature of the fluids, that our Author's doctrine, concerning an erysipelas, or an inflammation of the second order, is contrary to experience and the laws of secretions.

β. 4. WHAT I have here asserted seems to be confirmed by Fernellius, whose book is nothing more (if you except his stile and language) than a copy of all the antient physical Authors, who jointly attribute the malignity of inflammatory tumours to the greater grossness of the humours they contain ; it is for that reason, they all agree, that a carbuncle and a furuncle produce melancholy effects ; because they arise

from a gross fervent blood, &c. as appears from what follows.

“ CARBUNCULUS ex sanguine originem habet, non eo quidem tenui & laudabili, sed crasso ac nigro, calido tamen fervente, atque corrupto. Hic in quamcunque partem invaserit, eam mox exurit, pustulas circum se ardentissimas acerrimasque ciet, tandemque ardoris vi crusta vel nigra vel cinerea obducitur. Huic partes vicinæ longo sæpe tractu consentiunt, caloris dolorisque particeps: valida quoque febris accersitur. Inflammata pars nunquam suppurat, sed fervore exusta corruptæ carnis lobum tandem excutit, quo excidente, ulcus cavum sordidumque manet, hocque uno maxime a cæteris sejungitur tuberculis. Carbunculorum alius simplex, qui e solo ardore simplicique putredine nascitur, alius malignus, qui his etiam jungit

jungit venenatam qualitatem: talis in pestilentia grassatur, de quo plura proprio loco diximus."

Furunculus dothien Gracis appellatur tuberculum acutum cum inflammatione ac dolore, ovum columbinum magnitudine non excedens. Phymate ergo minus est, sed acutius, rubentius, ac dolore gravius. Phlegmones veram speciem exhibet, sed ejus exiguae & quae vix infra cutem descendat, atque subjectae carnis minimum comprehendat. Suppurat furunculus perinde atque phlegmone, hincque a simplici carbunculo discernitur. Fit autem non quemadmodum phlegmone e probo sanguine, qui in particulam vi quadam irruat: sed e crasso & vitioso, non perinde tamen atque in carbunculo extenso, quem a reliquo puriore natura secernens tanquam insensum atque inutilem

in corporis summa propellit. Quo-
circa ut phlegmone multitudinis, sic
furunculus cacoehymix saboles est:
raroque fit ut hic solitarius erumpat,
sed fere multis corpus scatet atque
inquinatur.* Vide Fernel. De ex-
tern. corp. affect. cap. 2. lib. 7. Pa-
thologiæ.

THE comparison here made by
our Author, between a carbuncle,
a furuncle, and a phlegmon, plainly
shews, that their different degrees
of malignity and intensity is owing
to the grossness of the humours,
from which they proceed; and this
was not the opinion of Fernellius
alone, but of all the Antients, from
whom he copied; therefore, the con-
clusion we have drawn in β . 2. and
 β . 3. of this section from experience,
the nature of the fluids, and laws of
secretions agree with the opinion of
all the Antients. For which rea-
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son, it cannot be supposed, that what we say is founded upon mere system or hypothesis; for all the principles of our doctrine are deduced from reason and experience; and indeed, no principle should be adopted in physic, which has not such a real basis.

HENCE we may judge, that the herpes, the itch, and all the other diseases of the skin are produced by an effort of nature, to debarraiss herself of the irritating causes from whence they proceed.

§. 5. I HAVE proved above in sect. 1. that no obstructions or stagnations can be supposed to take place in parts inflamed by the pricking of a thorn, stinging of Bees, Wasps, &c. It should not therefore be supposed, that the grossness of the humour which is derived to an
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inflamed part, is owing to its stagnation, or to the obstruction it meets with through the smallest capillary vessels, let them be of what kind they will. Besides the entrance of the humours into these vessels is very much hindered by their sensibility, which by Boerhaave himself and his followers, is judged to be very exquisite.

The most minute vessels in the human body are employed in the secretions and excretions, and particularly in those of sweat and insensible perspiration ; and as the functions of these vessels are most commonly suppressed or interrupted in an ardent and in all vehement inflammatory disorders, and the circulation at the same time is carried on in the largest vessels, we may lawfully infer that the smallest vessels in the body are more sensible than

than the largest; and that it is probable the force of a stimulus, be it internal or external, sooner invades the smallest than the largest vessels. As a saburra is sooner felt in the head than in the stomach, which it immediately vellicates, so, in the same manner, an impression made in the largest vessels may affect them less than their contiguous capillaries.

It is thus, the small vessels when irritated, solicit nature to send a greater quantity of fluid than usual to their neighbouring large vessels, which by pressing the *Oscula* or origin of the former causes a stricture in them, and an irritation proportionable to the quantity of fluid, which, upon these occasions, is sent by the heart to the affected part.

It is thus, the capillaries concur by their stricture to form swellings in their contiguous large vessels, and in the cellular membrane, and exclude it from their own cavities, which is quite contrary to what has been hitherto imagined. If the functions of the capillaries were not thus regulated, and if distensions or tumours could so easily take place in them, as most Authors have supposed, their texture would be soon destroyed, all the fluids would extravasate, and put an entire stop to the circulation in every inflammatory disorder.

β. 7. BOERHAAVE's doctrine concerning an inflammation of the second order is quite inconsistent with the mechanism by which the circulation is carried on in the capillaries ; because the suction and attraction,

tion, on which it entirely depends in these vessels, are much diminished, disturbed, and almost quite abolished in some inflammatory disorders, on account of their stricture and erethism, as it is proved in β . N^o. 1. and 5. of this Section.

β . 8. BOERHAAVE'S doctrine is contrary to the very arguments the celebrated Van Swieten produces for its proof in § 372.

THE surface of the skin grows red in persons who run or walk fast (says our Author) and in such as cry out loud, or use violent exercise; he attributes the redness in these cases, to the blood's getting into the ferous, or lymphatic arteries, and from this argument he and all Boerhaave's Followers conclude that an inflammation takes place in these vessels by error of place.

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THE redness observed in these cases is no proof that an inflammation can happen by error of place ; it can only be called at most, a disposition towards that disorder ; for it is seldom or never attended with any pain, and it vanishes according as the impression of the stimulus ceases, which indeed could not happen so soon, if the red globules were wedged into the serous or lymphatic arteries, especially if their structure is such, as it is represented by some of those who defend Boerhaave's doctrine. For from every secretory organ according to them, there spring out canals of such different structures that through some the red globules can pass, whilst the white globules only can get into the other canals. They say likewise that one red globule is equal in bulk to six or seven white ones, and that sweat and insensible perspiration pass
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out through pores and vessels of different kinds or diameters.

If all that be true, how can it be conceived that the red globules once impacted in the serous or lymphatic arteries can return back by their proper canals into the mass of blood? Besides, how is it possible that the serous or lymphatic arteries can be so much dilated, as to admit the red globules of the blood? certainly if they did, the redness upon these occasions would not so soon vanish.

In all such cases a greater column of blood than usual is sent to these parts to rid them of the irritation from which the redness proceeds. (See Sect. 2.) And perhaps the difference of these vessels is not greater than that which is between the pores and vessels through which sweat,
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96 *Of an ERYSIPELAS.*

and the matter of insensible perspiration do commonly pass; and which now by Physicians of the first distinction are judged to be the same.

LEUWENHOECK had discovered by the help of his microscope that the humour which seemed to be white in the capillaries, became red in the trunks; therefore we have reason to think that the redness which appears in the skin of those who run and use violent exercise, is owing rather to a greater column of blood than usual, sent thither by the sympathy of the heart, than to an error of place.

THE whiteness of the eyes proceeds from a slowness of circulation; but in order to account for it, it is not necessary to suppose their vessels so small as not to admit the red globules of the blood; for if
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it was so, nature could not conveniently send her universal remedy to relieve these organs, upon an emergency, from any accidents. The same thing may be said with regard to the whiteness of the skin, which is different in sickness, and in a state of health, according to the difference of circulation, as it may be seen in the same Girl when she is well, and when she labours under a chlorosis. The greater capacity of the vessels hinders not the humours they contain from being thin, especially, as the vessels of the eye, the brain, &c. are at a certain distance from the heart. This is easily perceived by those who know the laws of the secretions.

HENCE it is probable, that the circulation is stronger in a red rose, and that it contains a greater quantity of *spiritus rector* than a pale
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one, and that the difference of their colour may be thus accounted for.

I ALLOW that the vessels which we call lymphatics, should be narrower than those wherein the red blood commonly circulates; because as the circulation is slow in the former, they are seldom alike distended with fluids; for which reason, their sides must certainly approach one another, and according to the mechanic laws of the secretions, they should attract the finest and thinnest part of the humours; but it does not follow from thence, that the serous and lymphatic vessels cannot at one time admit a greater, and at another time a smaller quantity of fluids; nor does it seem consistent with the laws of the animal oeconomy, that they should be otherwise contrived.

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MOREOVER we know that the variety of colours depends upon the different reflections of the rays of light, and that the difference in these reflections proceeds from the different configurations of the bodies which reflect them. From hence and from the experiments of Leuwenhoeck, it is probable that a certain quantity of lymph gathered together may assume a red colour. Hence it may be concluded, that the systems of those who contend, that inflammations may proceed from the red blood passed into the serous or lymphatic arteries by error of place, is without foundation.

β. 9. VAN SWIETEN, for the greater proof of his assertion, uses also the following argument in §. 372. If any part of the body, says he, is exposed to the vapours of warm water, it will swell and look

redder than usual, from the ingress of the red blood into the smaller, relaxed serous or lymphatic arteries; from hence he concludes, that in inflammations, in the same manner, these vessels are so relaxed near their origin, that the red blood and other thicker humours than what usually circulate in them, can freely enter their orifices, and cause an inflammation of the second order.

CERTAINLY redness in this experiment does not proceed from a laxity of the capillary vessels in their origin, but rather from an irritation excited by the heat of the water. But if the body or any part of it, is for a certain time exposed to the like vapours, it becomes soft, relaxed and pale. Hence we see that some caution and prudence is required in the application of such vapours. Besides, as it is proved (page 76)

76) that the capillaries in proportion to their cavities or diameters are stronger than the largest vessels; it cannot be supposed that the vapour of warm water could so suddenly relax them.

MOREOVER, as it is allowed, that there are blood vessels all over the surface of the body, and that they are larger than the serous or lymphatic vessels, their tunics also must be weaker than those of the latter; (page 76) and consequently should be sooner and more easily relaxed; therefore, as laxity must begin in the blood vessels in the above experiment, their strength must be diminished, and for that reason they cannot be supposed to propel the blood more than usual into the aforesaid vessels; on the contrary, they should propel it less than in a natural state. It is thus, the large

vessels when relaxed in a dropsy, cannot propel the humours to the circumference of the body, as appears from the dryness of the skin in this disorder; therefore, as redness in the above experiment cannot proceed from the greater laxity of the serous or lymphatic vessels, or even of the blood vessels, it must arise from an irritation occasioned by the heat of the water.

§. 10. It is surprising that the redness of the skin after running, hard labour, or violent exercise, should be judged by the celebrated Boerhaave and Van Swieten, to be a preternatural state; for it would follow from thence, that young men and all those who are in perfect health, and in whom the skin is always red, should be in such a state, which would indeed be contradictory and very absurd.

I PROPOSE now briefly to explain the nature of an erysipelas.

AN erysipelas is that state of an inflammation wherein the affected part becomes white, when it is pressed with the finger; but soon assumes its former colour when the finger is removed.

A glutinous humour is supplied by the sebaceous glands to preserve the sensibility of the skin, and keep it moist, by checking in some measure, the egress of the fluid which goes off through its pores. This glutinous humour being wanting in an erysipelas, the skin is dry and parched, and little or no swelling can be perceived; because the erethism of the vessels is but small, and the morbid humours having nothing in their way to retard their egress exhale through the expiring vessels of

the skin. It is by the want of this glutinous humour that an erysipelas differs from a hot oedema.

IN an erysipelas the irritability of the skin is much augmented through want of the sebaceous humour, which in a state of health covers the extremities of its nerves, and defends them from external objects. The skins of Swans, of the Rhinoceros, and those of all amphibious animals, are covered with so large a quantity of this humour, that water cannot easily penetrate them. The bladder, the intestines, the mediastinum, pericardium, with all the membranes which line the different cavities of the human body, are covered with a humour not very unlike the sebaceous. The nature of this humour may be better understood from what I shall in the sequel quote from Dr. Sauvage, when I come to treat of a scirrhus,

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It may hence, in the mean time, be understood why the intestines sometimes by the force of an inflammation rather grow dry than swell; the same thing happens not only in these organs, but in every other part of the body, when the extremities of the expiring vessels are not covered with this sort of humour. But we are to remark, that the extravasated fluids cannot pass through these vessels, when they are inspissated by the force or duration of the disorder, as I am to shew when I come to treat of suppuration.

S E C T. III.

Of an OEDEMA.

“**U**T pituita alia tenuis, aquosa, aut mucosa existit, alia crassa & glutinosa, cujusmodi est quæ vitrea aut gypseæ appellatur: ita necesse est varios ex hac collecta nasci tumores. Ac primum quidem oedema tumor est frigidus, laxus ac molli, doloris expers. Nec calor, nec rubor, sed vel genuinus vel albidus duntaxat color inest: tumor sæpe magnus & qui pressio digito, vel nullo vel exiguo dolore cedit. Est autem duplex: unus collectus & circumscriptione definitus, qui propriè ac simpliciter oedema nuncupatur: alter diffusus & expansus, qui rectius tu-

tumor est oedematosus. Hic ex crudiore pituitosoque sanguine, aut jecoris aut assumptorum vitio progignitur, qui in nutriendas partes illapsus, nec in earum substantiam conversus, sensim cumulatus redundat partemque tumore distendit, ac fere retinet præmentis digiti vestigium. Ita sane in tabe, in cachexia & in leucophlegmatia, modo pedes, modo reliquum corpus omne tumidum evadit. Verum autem & exquisitum oedema non ex sanguine pituitoso, sed ex pituita fit supervacanea, quæ solum vel aquosa, vel mucosa sit, undecunque illa in affectam partem deferatur. Fere tamen e capitis distillationibus huic origo est, quæ sæpe in genua, interdum in humeros aliasque partes decumbit.”*

* Vide Fernel De extern. corp. affect. cap. 3. lib. 7. Pathologiæ.

Φ 1. As an oedema may proceed from two sorts of humours, so it is distinguished by Fernellius into two kinds ; the one which proceeds from a watery humour, and called by our Author a true oedema, to which may be referred cold swellings, a dropsy, for example, an anasarca, &c. and the other kind which arises from a sort of thick glutinous phlegm, called glassy or plastic. The Antients believed this sort of matter to be a black kind of bile, or a burnt sort of blood ; but our Author supposes it to be a superfluous blood, which nature not being able to assimilate sufficiently to nourish the body, throws out on the surface of the skin, where it produces a hot oedema ; and the glutinous matter which covers the skin in this disease, may be reckoned the principal cause why the humours are collected in the cellular membrane in inflammatory

tory disorders ; for when that matter is wanting, they pass out through the pores, as in an erysipelas.

Φ 2. OUR Author does not clearly shew the difference between a cold and a hot oedema ; the latter is distinguished from the former by its heat, and the pain which is felt when the affected part is pressed ; besides it yields not so easily to the touch, as in a cold watery oedema, in a leucophlegmacy for example, or in an anasarca ; neither does the skin retain the impression of the finger so long as in these cold disorders ; but still longer than in an erysipelas, nor is the colour of the part changed unless there is a diapedesis.

Φ. 3. I SHALL shew when I come to treat of suppuration, that an inflammation is most commonly oedematous,

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matous, and that one method of cure may be sufficient in a phlegmon, an erysipelas and a hot oedema. It can hardly be understood from our Author how a hot oedema can be inflammatory; for he seems to attribute it to bad digestion or the disorders of the liver; however, it is reckoned a true inflammation by Van Swieten, in § 386 of Boerhaave's aphorisms.

From the observations I made in the Hospitals of Paris, I found that a great number of Patients when weakened by the duration of their ailments, were wont to complain of an intolerable pain all round the abdomen, and in three or four days afterwards to have its whole cavity distended with fluctuating water. I also observed, that others complained of the like pain in the inferior extremities, before the water descended

descended to the legs and feet. I have seen others recover from drop-sies by taking antiphlogistic purges after bleeding.

WE are to remark also, that the celebrated Dr. Mead, cured an hydropick Patient by narcotics. Willis employed them also with success in a similar case, and the learned Spon cured an hydropick by twenty bleedings.*

THESE facts being premised, and the simplicity of nature in her operations being attended to, quere, whether there be any analogy between a cold and a hot oedema, and whether they both proceed from similar mechanisms? Certainly the symptoms which precede the ingress of the serum into the cellular membrane are not very unlike those which

* See Medical Precepts, by Richard Mead, M. D., chap. 8.

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are observed before suppuration takes place. In both cases, to be sure, nature struggles as much as possible, before she admits the humours into the cellular membrane, and commonly the resistance upon these occasions is very great, especially in dry melancholick habits, as I have observed very often. I attributed the dropsey of this class of Patients to spissitude and want of serum in the mass of blood occasioned by an excess of perspiration, which sometimes happens to be so immoderately great in this sort of People, that the blood is so much deprived of its vehicle, that it cannot furnish the minute ramifications of the nerves or lymphatics, with a sufficient quantity of the fluids to which they are destined. Hence the force of the Solids is diminished which occasions a lentor, weakens digestion, and brings on a dropsey.

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A HOT oedema arises from a column of humours preternaturally encreased and distending so much the sides of the vessels, that it causes pain. If the distension and pain continue for any time, the vessels lose their tone and contractile force, the pores are enlarged and a free passage opened for the humours into the cellular membrane.

ALMOST the same thing is observed to happen in a cold oedema; for the vessels being too much compressed by a superabundant quantity of serum, the Patient feels great pain, or a very considerable anxiety, until at last, the vessels deprived of their tone and contractile force permit a free passage to the serum into the cellular membrane, or into the other cavities of the body.

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FROM hence we may see, that the vessels and pores can be dilated by too much motion or by too much laxity. The last case is quite foreign to my subject; I only mention it, in order to take away the equivocation which might arise from a cold and a hot oedema. I proceed now to shew the defect of Boerhaave's doctrine concerning the latter.

A HOT oedema, according to Boerhaave, takes place in the lymphatic arteries nearer the apex of the cone than an erysipelas, and in that they differ from one another; besides the blood has no share in producing this sort of oedema.

AN oedema is the second species of inflammation of the second order according to our Author, I have proved in sect. 2. β . N^o. 1, 2, 3, 4,

5, 6, 7, 8, and 9, that it cannot possibly exist.

ALTHOUGH it is evident from what has been said in sect. 2, that nature cannot send a particular humour different from the blood to form an oedematous swelling; yet I will for a moment admit the supposition and reason in consequence of the following quotation, wherein Boerhaave maintains the lymph to be the quintessence of the blood. “Aquosior, fluidior, salina, spirituosior portio cruoris sic separatur ab arterioso sanguine ope glandularum, quæ vadit in vasa minima ad motum & nutrimentum; reliqua pars crassior, rubra venis redditur sensim latioribus sine obstructionis metu; ergo cruor arteriosus primo venoso dilutior magisque lymphaticus, cujus effectum vasa majora aperta tenentur, robur corpori datur, materies constantiori

refectui fervatur, sed inde venoso cruori dilutionis necessitas, ut fluat, iterum per arterias minimas pulmonales aliasque: hocce effectu lymphæ glandulis secreta functa suo munere et circuitu redditur immediate vel per ductum Pequeti ante novum in cor ingressum. **

As it appears from hence, that the lymph is accounted by Boerhaave to be the most spirituous part of our fluids, and to be the chief agent of nutrition and animal motion, its quantity with regard to the other humours, should be very small, and the vessels which contain it should be also small in proportion, if compared with those which contain the rest of the humours. For the same Author asserts in his chymistry, by the authority of Mr.

* Vide Institut. Med. § 209. Boerhaavii.

Boyle,

Boyle, that the *spiritus rector* of the plants is not equal to the $\frac{1}{100,000}$ part of the water or vehicle which contains it. May not therefore the same thing be said of the lymph, which the former accounts to be as it were the *spiritus rector* of the human body. It is well known, that there are many pellucid tumours, called lymphatic, which contain upwards of 9 or 10 lb. of fluid, and the muscular motion at the same time not in the least impaired. Now I ask of those who defend our Author's doctrine, from whence such a prodigious quantity of lymph can come? From whence so much quintessence in the blood? To pretend that such an accumulation of fluid could be furnished by the lymph, or from a rupture of its vessels would seem altogether absurd; besides, how is it possible that the blood vessels could remain quiet and easy,

and make a truce, as it were, with the morbid matter during the time, which a swelling of so prodigious a size requires to its formation? Therefore, it does not seem reasonable, that nature can send any kind of humour preferable to the red blood to form a hot oedematous swelling. Indeed it is more likely that the blood, the pus and ichor with all the diversity of humours which are found in such swellings, are engendered by the heat, pulsation and pain of the affected part. Moreover, this sort of swelling comes on suddenly, an instance of which fell lately under my own observation, when a white pellucid tumour of a surprising bigness, I perceived to arise round the knee in the space of one night. Such a swelling could not certainly proceed from the lymph.

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THE Antients attributed oedematous swellings to an atrabiliary humour. Modern Authors thought it was easier to keep this opinion in view with a little conjectural alteration, than to make observations of their own. It is for that reason, Boerhaave attributed this disorder to the serum or lymph, and banished the term atrabilis. But as most of the Antients understood by this term, *fæx sanguinis*, that is the dregs of the blood, it was more likely to produce a hot oedema, than the serum or lymph.

THE term atrabilis, or *fæx sanguinis*, should not be intirely expunged out of physick; because, in the sense of the antient Physicians, it comprehended many ideas; for they were so exact in distinguishing the different constitutions of their Patients, that they called one constitution,

phlegmatic, the other sanguine, &c. Such as they found of a dry hot constitution, thoughtful, lively, and given to speculation, they called bilious. Indeed they were not much mistaken in their account, for these People commonly perspire so much, that their blood, not having a sufficient quantity of vehicle or serum, produces heat, costiveness, and an alkalescence of the bile, from whence inflammatory disorders very often proceed. Tumours arising in such habits, were supposed by the Antients to proceed from an *atrabilis* or *faex sanguinis*, that is a thick hot kind of humour wherein the bile had a share. Hence we see, that the Antients, though unacquainted with the true mechanism of secretions, were persuaded that the grossest part of the humours was derived to inflammatory tumours, (*β. 2, 3, sect. 2.*)

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THE extremities of the nerves all over the body, are covered with a mucous or glutinous humour, like that which the sebacious glands furnish for the cuticular nerves. The more this humour abounds in the cellular membrane, the more the fluids derived by the force of an inflammation to that membrane, shall be detained, and of consequence the swelling shall be greater ; but as this glutinous humour is seldom wanting in the cellular membrane, or in the surface of the skin, so also an inflammation seldom happens which is not oedematous.

As the thinnest fluids, upon these occasions, are very requisite to extinguish heat, and prevent concretions, quere, whether this glutinous humour, and the stricture of the capillaries were not providentially contrived to detain them in the body?

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IN some consumptive habits whose humours are very acrid, dry, and inspissated, whose vessels are almost empty, and in whom the force of the heart is very small, little or no oedema or tumour can be perceived, altho' the ulcers, which spread over their legs, thighs and other parts of their body, are evident signs that they labour under a very severe inflammation. No swelling appears in these cases, perhaps, because the sebaceous humour is defective, being consumed by the long duration of the disease.

THE diversity of heat observed in inflammatory tumours, consists in the different degrees of coction of the morbid matter, whereof I am to speak more at large, when I come to treat of suppuration.

I MAKE no doubt, but that several Persons, as well as myself, have observed

served a phlegmon on its decline, to assume successively the forms of an erysipelas and oedema, and by nature or art soon to vanish; which would not certainly happen so soon, if they proceeded from an inspissated blood, serum, or lymph wedged, if I may use such an expression, into the smallest vessels.

For which reason, as these different appearances of an inflammation are known to arise successively in the same place, it seems very certain, that they proceed from the same cause, namely, from the same kind of humours, in the same series of vessels, and that they are nothing else, but the different degrees of intensity of the same disease. Besides, it is known by experience, that they are cured by the same remedies, which sufficiently confirms the truth of what we have advanced upon this

this article ; therefore it is quite needless to place these three appearances of an inflammation in three different sections of a cone, and to attribute each of them to a particular humour, and indeed it is quite contrary to what any Physician or Surgeon will find verified by observation in his own practice.

S E C T.

SECT. IV.

Of the DIAGNOSTIC SIGNS

OF AN

INFLAMMATION.

I. **T**HE Diagnostick signs of an inflammation may be taken from its definition, page 19, and from its effects, (chap. 1. sect. 1. β. N^o. 4, 5, 6, 7, 8,) and its different names are known from the different parts wherein it takes place. Φ. 4. sect. 1. chap. 1.

PROGNOSTIC SIGNS.

THE dignity of the affected part, the greatness of the swelling, the con-

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constitution of the Patient, and the intensity of the symptoms will declare the future event of an inflammation. Therefore, if the Patient is conscious that his humours are not vitiated by the pox or scurvy, scrophulous diseases, &c. that the phlegmon has not penetrated deep into the parts under the skin, we may safely say, that it is void of danger, and that it is like to terminate by resolution, or at least by a laudable suppuration.

WHEN the parts attacked by a phlegmon, are of a firm texture, and have but a small quantity of vessels, such as the ligaments and glands, the cure is tedious, and suppuration cannot be brought on without much difficulty.

THE danger is greater or smaller according to the pain, heat, pulsation,

PROGNOSTIC SIGNS. 127

on, &c. and according as the vascular system of the Patient is more or less irritable. If these symptoms are lessened by degrees without leaving a hardness in any glandular part, it is certain, that the disorder will not degenerate into a scirrhus. But if these symptoms cease suddenly, the epidermis is raised into blisters full of ichor, or sinks, and the colour of the part becomes black, or livid, whilst the pulse at the same time is but small, the urine and excrements become fetid, and the sensibility of the affected part is intirely abolished, it is most certain, that a gangrene is approaching or already begun. When a glandular part, after the symptoms are lessened by degrees, becomes hard and resisting to the fingers, a future scirrhus is to be foretold. The phlegmons which take place in the eyes, throat,

ten-

tendinous, or nervous parts, are to be accounted dangerous. The deeper the phlegmon penetrates into the affected part, the harder it is to be cured.

S E C T. V.

*Of the CURE of*INFLAMMATIONS *in GENERAL.*

THE indication of cure for this disorder, directs the use of all such means as may tend to lessen the erethism of the vessels, and to abate the encreased velocity of the fluids. These are both lessened, or sometimes totally cured by venesection, mild purges, diluents, acids, oily, mucilaginous, and narcotic medicines prudently administered.

1. THE

Of INFLAMMATIONS. 129

I. THE diet should be diluent, lenitive, and cooling. Blood should be drawn in proportion to the fluxion, the intensity of the pain and other symptoms, and according to the strength of the Patient; large draughts of barley water, rice water, with nitre from ʒj to ʒj to every pint, also maiden-hair tea, whey and other liquors of the same class, are very efficacious.

THE emulſio communis of the London pharmacopœia is excellent upon these occasions; but it will become more agreeable, if instead of gum arabic, you substitute the four great cold seeds of each ʒj.

IF the emulsion should weaken the stomach, you may in its stead use barley water, aromatized with some agreeable herb, and sweetened with the syrup of maiden-hair.

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IF the emulsion does not pass off freely by urine, a proper dose of nitre may be added to it occasionally; for as no salt diffuses itself in any fluid so much as nitre, it must be very efficacious, by exciting gently the contractions of the vessels, to prevent the concretions of the animal fluids, in an inflammatory state; but it must be taken with a sufficient quantity of drink; otherwise it may irritate the viscera, and particularly the kidneys and urinary ducts. Most commonly it carries its action upon the latter, and when it does, we may generally expect good effects from its operation; but in the disorders of these parts, we are to be cautious, least it should irritate too much; it should therefore be given in small doses, in these cases, especially by young Practitioners, who have not skill or experience enough to form a

a judgment concerning the sensibility of the Patient.

We may be assured, that nitre irritates, if, when it is administered in proper doses, the quantity of urine compared with that of the drink, is too small.

2. AFTER bleeding in the foot, or in the jugular vein, and administering a gentle purge to clear the primæ viæ, a semicupium of warm water will sometimes ease inflammations of the head; for by the heat of such a bath, a great quantity of humour is derived from it to the inferior extremities, by which means their column and quantity is lessened in the vessels of the brain, and of consequence their irritation and erethism. A small inflammation of the brain is thus very often cured. A warm bath is no less efficacious

in curing inflammations in other parts of the body. For the fibres grow hard in this disorder, it is no wonder, therefore, they should soften with warm water, when the very horns of Deers may be rendered as soft as jelly, by being exposed to its vapours. A vapour bath, and fomentations produce the like effect, especially when they are more or less impregnated with emollients and aromatics, or with acids. Fomentations of warm milk may be ordered for the same end, with great success, or a decoction of the root of althea, applied warm. A poultice made of ground linseed, or a fomentation made of its decoction will answer the same end.

AFTER employing baths, vapours, or fomentations, the following topics may be used.

3. OINT-

3. OINTMENTS, sweet oils, liniments, anodyne pulteffes, made up with bread and milk, the oil of olives, linseed oil, and saffron, or diascordium, applied outwardly will contribute to lessen the erethism, not only of the external parts, but also of the internal viscera of the abdomen, and of the thorax. The ointments of althea and elder, the oil of olives, either jointly or separately, in equal quantities, may be applied to the side ; for example, in a pleurisy. The following fomentation may be applied in the same case. Take four ounces of the tops of white poppies, boil them in two quarts of common water, until they are reduced to one, strain, and add two ounces of vinegar ; make a fomentation to be applied to the affected part.

4. In an *erethism* of the throat, oily potions, with some gentle *mar-cotics*, may be given with success.

INFLAMMATIONS of all parts of the body are cured after the same manner, but we should have regard to the structure, situation, and connection of these parts, to the antecedent causes of that disorder, and to the constitution of the Patient.

It is certain, that the fibres grow hard by the force of the *erethism*, and by that means lose their flexibility; therefore, to bring them to their former state, it is necessary to use a great quantity of oil, especially in the inflammations of the *primæ viæ*; but regard must be had to the strength of the stomach and constitution of the Patient; for they are not to be given to such as are of delicate habits, without some precaution,

caution, and if they do take any oily medicine, it should be mixed with some agreeable aromatic or stomachic distilled water. Dispensatories abound so much with receipts of this kind, that it is needless to insert any here.

As it is necessary to keep the body open, the decoction of tamarinds or prunes, lenitive electuary, salts and manna, &c. &c. should be given or administered either in a draught, or in the form of a glyster.

THE *primæ viæ* being thus cleared of all fordes, by the foregoing medicines, absorbent draughts, such as the decoctum album, or julap creta of the London Dispensatory, are to be prescribed in the inflammations of the intestines, as often as they proceed from any vellicating acrimonious leven; and if the Patient finds

ease by them, he is to use them plentifully, and afterwards to take a gentle purge. In the same case glysters are very efficacious.

GLYSTERS are of great service in inflammations of all parts of the body, because they derive a great quantity of humours to the intestines, and because they pass immediately into the vessels without weakening or fatiguing the stomach.

NOURISHING glysters are to be injected, when the functions of the organs of deglutition are disordered, or weakened, or when, on account of a violent vomiting, the aliments are rejected by the stomach. Often have I seen life supported a long time by this means.

5. IF by too rapid a motion excited by an inflammation, the humours

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humours are so much rarefied, that they occasion a false plethora, we must have recourse to acids. No Physician doubts, but volatile alkalies, by the force of inflammations are produced in the human body, and as a sulphureous principle makes no small part of the composition, they powerfully dissolve the blood.

WE are taught by chymistry, that acids have a great affinity with volatile alkalies, whose smell is owing to their combination with sulphur; hence it is probable, that acids taken inwardly, by uniting with the volatile alkalies, (which by the force of the disorder, may be extricated from the mass of blood) blunt their stimulus, lessen the erethism, and prevent the dissolution of the humours.

FROM hence, and from the answer given to the fifth objection, β . 4. chap. sum

chap. 2. it is probable, that the particles of the fluids are attracted to one another, by the help of acids, and that their action against the sides of the vessels must necessarily be lessened by these means. Besides acids powerfully dissolve the particles of tartar, which sometimes get into the mass of blood. From all which it is easy to judge why acids are so efficacious in the cure of inflammations.

6. If the greatness of the pain hinders the Patient to sleep, he is to be ordered some preparation of opium, and after bleeding, diluting and evacuating the sabura of the prima via, with a gentle purge prepared with manna, tamarinds, and some neutral salt. It is certain, that the impression made by narcotics, in the parts which they immediately touch, soon abates the sensation of pain wherever it takes place, and this must

must be owing to the sympathy which subsists between the different parts of the human body, and not to the immediate application of these medicines, a truth I have seen verified in many instances.

Narcotics taken in the mouth, or in glysters, soon stop or abate pain in any part of the body, as every one of the Faculty must have experienced. It is impossible that could be effected in so short a time, by an immediate contact; therefore the impression made by them in the stomach or intestines, is such, that it is soon communicated to the whole nervous system; whether that impression is pleasing or irritating, we are quite at a loss. If a young tame, well fed Quadrupede is gently stroked in any nervous part by a Person with whom he is familiar, he stops,

stops, and is put into such an extasy, that he throws himself sometimes on the ground, and, if the stroking is continued, falls a sleep, of which I have myself seen many proofs made in animals of different kinds. It is surprizing how variously the nerves are affected, not only by inward and outward applications, but by different sounds. Music touches the ears of most People very agreeably, and the young more than the old; as we may observe in Children, in whose tender nerves such a pleasing motion is excited by the songs or humming of their Nurses, that they generally fall asleep; the bag-pipes have the effect of a diuretic on some People, according to the testimony of Dr. Whytt, in his treatise on animal motion. Good news moves the nerves of some individuals so pleasantly, that they die in an extasy of blifs, and the death occasioned by too great a dose of narcotics is equally pleasant.

BUT

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BUT we cannot infer from these similar effects, that the pleasant sleep procured by narcotics is owing to a pleasing impression.

I HAVE proved by a great number of experiments, that pain in People of all ages, can be stopped by an immediate application of narcotics to the affected part. Is it not, therefore, beyond all doubt, that an impression made by these medicines in any part of the body, is communicated to the whole nervous system?

ALTHOUGH narcotics seldom fail to abate pain in robust habits, they should not be administered to weak and delicate People, without a great deal of prudence and precaution; especially if they are not accustomed to take such medicines; for according to the proverb, *natura consuetis gaudet*, custom becomes a second nature

ture. It is thus the Turks accustomed to take opium from their infancy, use it instead of spirituous liquors, to get drunk before they go to battle.

ABOUT the last stage of an inflammatory disorder, the theriaca of Andromachi, may be given from $\mathfrak{zj}$ to $\mathfrak{zj}$. when the Patient is restless, especially if the skin begins to grow moist. But if it be necessary to solicit the oscillations of the vessels, Dr. Huxham's essence of antimony, may be given from 6 to 30 or 60 drops, in a glass of wine, or in a dish of tea. If a gentle tonic medicine is wanting, the saline mixture of Riverius, with an addition of a little cinnamon, or nutmeg water may answer that end.

By the help of these medicines, and others, taken occasionally from the

the class of stomachics and cordials, we can rouse up the decaying strength of the Patient, disperse beginning obstructions, and prevent their future growth.

By the application of baths, vapours, liniments, and such like topics, as we recommended above, it may happen, that an erethism may be intirely cured, and the preternatural velocity of the fluids lessened, and brought to its due degree of uniformity in the affected part. The humours which were propelled by the force of the erethism into the cellular membrane, find by these means, a free passage to run back by the inspiring vessels into the mass of blood, or to exhale through the expiring vessels by the pores of the skin; and though the erethism of these parts may not be overcome by topics, as it happens very often, espe-

especially when proper internal medicines are not ordered at the same time, and when the strength of the Patient is too great, we have still this advantage, that the texture of the skin is so much softened by the use of topics, that the extravasated fluids can easily pass out thro' its pores.

By a skillful and timely application of medicines, not only an infinite number of abscesses, but loss of limbs, and fatal ulcers may be prevented, and it is only by a perfect knowledge of physic, we can be directed how to act in such cases.

Any impartial judge must own, that the remedies prescribed in this section, directly answer the indications which I have drawn from the essence or prime attributes of an inflammation.

BUT

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BUT should any one take the indications of an inflammation, for example, from the proximate causes to which it is attributed by Boerhaave and Van Swieten, in aph. 371. he might try many useless experiments, and do the Patient more harm than good. This will appear more clearly in the following chapter.

C H A P. II.

Which proves the curative indications of an inflammation to be repugnant to Boerhaave's doctrine, aph. 371.

ACCORDING to our Author, an inflammation proceeds from a stagnation or siziness of the blood, serum or lymph in the capillary vessels. If it did, the medicines which are properly called aperients, and attenuants; sassafras, for example, lignum guaiaci, and such drugs as encrease the blood's motion, would be very efficacious in the cure of this disease, even in its increase and vigour. On the contrary, acids by coagulating the blood, and lessening its motion, would be hurtful, and emollients would be no less prejudicial, because the capillary vessels in
that

that hypothesis, would be so much distended by the accumulated fluids, as to be in a proximate state to a rupture, which would soon be completed by the softening quality of such medicines; but the contrary evidently happens in practice; for emollients and acids are prescribed with success, to diminish the stricture and erethism of the vessels in an inflammation; for which reason, it may be justly concluded, that Boerhaave's doctrine is contrary to the curative indications of that disorder.

β. 4. SOME unexperienced Gentlemen, who consider the materia medica by the lump, and have no certain rule to guide them therein, may object, that attenuants and aperients, are really efficacious in inflammations.

I OWN, that aperients and attenuants are sometimes useful towards the last stage of the disorder, and that by a proper application of them at that time, obstructions and scirrhi are very often prevented; but, I deny that they can be useful in the vigour and encrease of this disease, for by irritating the solids with the hard particles upon which their virtue depends, and by which they procure heat, they would entertain and encrease the crethism of the vessels.

β. 5. MANY will object, that vegetable acids, far from coagulating the blood, dissolve it.

ALL Physicians agree, that acids are cooling, but they cannot cool a living body, without diminishing the action and re-action of the solids and fluids; therefore a lentor must necessarily

necessarily follow an immoderate use of acids, whether taken as aliments or as medicines. For the blood must contain the principles of our food, according to the axiom, *principiata redolent naturam principiorum*, and the chyle, by heat as well as by want of motion, grows acid; besides it affords a great quantity of it by a chymical analysis. But acids in general have a property of coagulating; therefore it can be asserted, that the chyle and blood resulting from a lentor occasioned by an immoderate quantity of acid aliments, are apt to coagulate and form concretions. Every one may with me have observed, that those who make an immoderate use of farinacious food or acescent vegetables, as rice, oat meal, peas, beans, &c. in pap, or lemons, oranges, limes, with all other kinds of fruit, look pale, have bad digestion, are subject to obstructions,

tions, bilious fevers, and other disorders of the liver, which are removed chiefly by the use of alkalies, purges and absorbents. The truth of what is here advanced, will be allowed and confirmed by any one of the Faculty who has been in Jamaica, or in the other southern islands of America, where the inhabitants, by using too much fruit or an acescent diet, are universally subject to the disorders which proceed from a superabundance of bile.

WHAT I have said concerning vegetable acids, is contrary to Van Swieten's commentary on aph. 117. of Boerhaave. Indeed, what is there affirmed by this celebrated Author, is not conformable to experience, for he puts wine, vinegar, milk, and fruits of all kinds in the same class, and says, that they all dissolve the blood very powerfully. I am persuaded,

suaded, that this mistake is to be attributed rather to a slip of the pen, or a fault of the Printer, than to our Author. For it is well known, that very few Physicians in Europe excel him in his knowledge of the *materia medica*.

I ALLOW that fruit and vegetable acids are very efficacious to lessen the stimulus of the blood, and that by an immoderate use of them, it may be taken away intirely; but in a short time they generally engender in its place a more hurtful stimulus; for when they are used as aliments for too long a time, they supply a bad acescent chyle, which may pass in the meseraic veins to the liver, in so great a quantity, as to thicken the bile, take away its activity, and render it partly or altogether unfit to dissolve and combine the different elements of the chylus

mus ; from whence proceeds bad digestion, bad chyle, bad blood, and a lentor, which bring on obstructions, concretions, irritations and colics, with the other evils which arise from such complications.

It may not be foreign to our subject, to observe in this place, that acids are recommended by Galen to cure the scirrhi of the viscera, but he ordered them to be mixed with aromatics or with bitters ; but what results from such a mixture, is entirely different from vinegar, for example, or any other acid, and for that reason, possesses different properties, and produce different effects. Many Physicians give vinegar plentifully as an attenuant in all obstructions, and in a moist or dry asthma. I allow that vinegar acts sometimes as an attenuant, but it does not follow from thence, that it should

should be ranked in the class of attenuants, for such an arrangement would produce a confusion in the materia medica, which would be very prejudicial in the practice of physic. Calcined hartshorn and rice are very efficacious in a diarrhœa; but surely no Physician will say, that they are astringent, yet we know, that some empirics give them that name, and they retain it eternally in families, where such People have credit, and these families would account the most learned Physicians very ignorant, if they should prescribe them in any other illness, but a diarrhœa; for relying intirely upon the affected gravity and authority of these favourite pretenders, it is impossible to persuade them, but that the astringent effects of these ingredients, are owing to their essence or nature, and not to any accidents.

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THE same thing may be said of acids in general, and of vinegar in particular, which only becomes an attenuant by its effects, in asthmas and obstructions, though it has not that property essentially. We are to remark, that real attenuants would be very noxious in circumstances, where vinegar is useful, and that it is by the rules of physic, only we can know this difference.

NOTHING helps us more to make a happy progress in the practice of physic, than a due distribution of medicines into proper classes, and all the abuses which are committed in the materia medica, proceed chiefly from want of that arrangement. Have we not therefore, reason to fear, that vegetable acids, lemon juice, vinegar, fruit, &c. ranged by Van Swieten, in the class of attenuants, may lead young beginners in-
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to innumerable errors ? Are not the evils which arise from thence the more to be feared, as the authority of that celebrated Author prevails so much all over the universe, that whatever Physician will dare to contradict it, must endanger his reputation?

MANY Empirics, and even some Physicians to this day, boast of the great success they have had in administering internally preparations of gold, silver, copper, and lead. Such errors probably derive their origin from some celebrated Physicians, who prescribed them, perhaps, for the sake of trial, before physic was so well cultivated as in our days.

SOME use preparations of lead very frequently in gonorrhœas, and believe them to be specific, though nothing more certainly destroys the
stomach

stomach or intestines, than that mental, of which forty Persons, who died by drinking small wine, wherein litharge was infused, afforded me a fatal proof.

THE design of these remarks, is to shew that the careless slips or insinuations of great Physicians, are very dangerous, especially with regard to acids and acescent aliments, as may be observed by the great number of Negroes, which our Merchants and Planters lose by a mealy acescent diet ; for they are seldom allowed any thing but rice in the passage from Africa to America, which by turning sour on their stomachs, produces all the bad effects of acidity, and very probably renders their perspiration too slow, and it is from thence, perhaps, and from their other concurring circumstances, that they have such a disagreeable smell ; for the
humour

humour which passes off by sweat, and insensible perspiration, are of the same nature with the urine, so that when they are retained, they may acquire a bad smell in the same manner as the urine, as I shall explain, when I come to treat of obstructions:

RAMAZINI remarks, that cleansers of jakes are subject to inflammations of the eyes*, and in some countries abroad, (I will not name) where instead of jakes, pots are kept in the bed rooms, the People are very much subject to ophthalmies, and such of them as I advised to keep out of the way from bad smell, soon got rid of their disorder.

FROM hence it is certain, that the acrid effluvia, which offend the nose, are also offensive to the eyes,

* See his Treatise on the Disorders of Artificers, chap. 14, translated into English by Dr. James.

and

and that the fetid particles which exhale from the bodies of the Negroes, render them so much subject to opthalmies in their passage from Africa to America. The poor wretches are bled so copiously on these occasions, that the circulation is weakened, and the disorder encreased, until it carries them off.

WE are to remark, that the blood resulting from acescent aliments, especially in these People, who grieve without doubt, on account of their confinement, must be poor and contain but little spirit, and that of consequence, they cannot bear to lose much of it; for which reason, they should not be bled without due precautions, but should be treated according to the method prescribed by Ramazini, and the disorder should be prevented by allowing them better food,

food, and keeping the place where they lie very clean and as free as possible from bad smell.

I WAS informed by several Portuguese Captains who use the African trade, that they feed the Negroes the same way as the Sailors, and give them sometimes a little wine, and that they seldom lose many of them in passing from Africa to their colonies.

I MAY venture to say, that whoever has recommended rice as a continual diet among our Negroes, has been necessary to the death of so great a number of them, as to be a great hindrance to the cultivation of our colonies, and cause our Merchants and Planters to lose many thousand pounds sterling, per annum.

I do not mean to forbid intirely the use of rice, and other mealy substances; on the contrary, I allow, that in hot climates, it may be necessary for all degrees of People to take such food now and then, in order to check perspiration, and retard the excretion of the liquid part of the aliments. But when a custom prevails with regard to food as well as dress, it is very hard to remove it; and, perhaps, our Merchants and Planters, will never change their method of feeding the Negroes, even when they are informed by what is here advanced, that it is much against their interest to continue it.

MOST of our cotemporaries content themselves with the thoughts, manners, and examples of their predecessors, without examining whether they be good or bad; because such an enquiry would cost some pains and

and labour, and very few are fond of interrupting their pleasures upon such an occasion.

As my assertion, concerning the increase of the bile, from an immoderate use of acedcent vegetables, is a new opinion, it may be objected to, by those, who with Dr. Haller, maintain, that as the bile has the property of soap, it must be always composed of proportionable quantities of oil and alkali, which can only give it that property according to their supposition.

THE invalidity of this objection, may be easily inferred from what I have already advanced on this subject, and as soap can be made with oil and acid, as well as with alkali, the soapy property of the bile can afford no ground for an objection against me.

C H A P. III.

Of the Resolution or Dispersion of an Inflammation.

THE resolution of an inflammatory swelling, does not happen until the disorder is upon the decline. Fernelius says nothing in particular about it, Boerhaave explains it in the following aphorism.

“ 386. Si humor fluens blandus, motus ejus sedatus, causa obstruens non nimis solidata, obstructio, parva eaque imprimis in arteriis vel in initiis lymphaticorum, canales mobiles, diluens vehiculum, reducto fluore concreti, motu stagnantis, solvitur inflammatio resolvendo.”

BOER-

BOERHAAVE supposes in this aphorism, that all inflammations proceed from an obstructing matter, concreted by stagnation; but would it not seem very absurd to assert, that the inflammation which happens the instant that the tendon of the muscle biceps is pricked by a lancet, should proceed from such a cause? Can stagnation happen so suddenly? And if it could, how is it possible that the stagnating fluid could be concreted in an instant? It is certain, that the humour collected in the cellular membrane during the inflammation, may be concreted by the heat which attends this disorder; for we may see hard crusts remain under the epidermis, after some superficial inflammations, and the same may happen internally; for as nature contrived the epidermis to surround the whole superficies of the body, so she has been no less kind in supplying every

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vessel

vessel and every muscular fibre, with a particular membrane, under which may lodge the matter concentered by an inflammation, the same way as under the epidermis. But no Physician or Surgeon will say, that the crusts which remain under the epidermis after an inflammation, were the cause of that disorder; therefore, there can be no reason why the like concretions should be the cause of inflammations in the internal parts of the body; for the example I have mentioned, evidently proves, that they are its effects, and not its cause.

HENCE it is demonstrated without the help of any system or hypothesis, that the humours attracted to an inflamed part by the force of an erethism, can pass into the cellular membrane, as well as to the epidermis, without the rupture of any vessels.

See

See page 58. In treating of obstructions, I will enlarge more on this subject.

IN the last stage of an inflammation, the erethism of the vessels, with the velocity of the fluids, diminish gradually, until the motion of the humours becomes so sedate and uniform, that the matter of insensible perspiration can run out through the pores of the skin as free as in a state of health; but it cannot pass out that way, without meeting the matter, which during the inflammation, was inspissated and collected in the cellular membrane, without mixing therewith, and rendering it more fluid. As the humour of insensible perspiration goes off in a warm vapour, it should dissolve concretions very efficaciously. When the morbidic humour is attenuated by this vapour, it should

go where it finds less resistance, and either return into the mass of blood by the inspiring vessels, called absorbents, or pass out by the expiring vessels through the pores of the skin.

WE are to observe, that seldom any part of this fluid returns into the mass of blood, for the pulsation of the vessels, and the direction of the humour which goes off by insensible perspiration, determine it to pass out through the skin. But as this cannot happen, until the erythism, and the preternatural velocity of the fluids cease, it may be easily understood, that an inflammation can never be terminated in the cellular membrane. For an inflammation never ceases on account of a preceding resolution; but a resolution of the morbid matter comes on, because the inflammation ceases; therefore, our Author has no reason
to

to assert, that an inflammation terminates by a preceding resolution.

It follows from what is said in this section, that the resolution of an inflammation does not happen after a suppuration, but when without any suppuration, the disorder ceases.

WE have nothing to do with the first part of this objection, because it attacks the principles of Boerhaave, who contrary to our opinion, asserts, that an inflammation terminates by suppuration, but if after suppuration the inflammation does not cease, there can be no resolution. We know that suppurated tumours are often removed by a salutary metastasis. As to the second part of the objection, we acknowledge, that an inflammation goes off without any suppuration, when nature overcomes the disorder.

SIGNS

SIGNS of Resolution.

WHEN an inflammatory swelling is but small, without any fluctuation of matter, and the rest of the effects are not very intense, but vanish by degrees, it is certain, that it will pass off by resolution or dispersion.

THE resolution of an inflammation may be procured by the remedies I have recommended, in sect. 5. chap. 1.



- Page 1. Line 11. for Fernallius, read Fernelius.
 5. 5. after erysipelatodes, read schirrodes & oedematodes.
 79. 2. after and, read Van Swieten.
 90. 18. after ardent, read fever.
 96. 15. for sympathy, read force.
 135. 17. after julap, read e.
 138. 16. after opium, dele and.